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**Effect Evaluation of Gated Housing Projects  
Accumulated in Suburban Residential Areas of  
Bangkok Metropolitan Region**

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**Doctoral Dissertation**

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## ABSTRACT

The issues about residential problem have been paid attention to improve the living quality of residents in those residential projects. The type of residential has been developed with the long-standing period based on the contexts of each city. Bangkok Metropolitan Region (BMR), which has been an explosive increase the growth of global urbanization and population, has been expanded urbanized areas with massive infrastructure development especially in peripheral area. This situation has motivated private developers to take possession of largest lands occupancy and residential development in suburban area. The style of low-density residential development is shaped by demand of properties protection from huge income gaps among citizen in suburban area. The developers provide common fortification and access control inside the project that duplicate the American housing model, called Gated Housing Project (GHP) in this study. The continuing demand of GHP exists in peripheral areas, which has a weak urban planning and misused land use development. These areas have been mainly shaping by the infrastructure for automobiles because of insufficient public transportation development. This phenomenon behaves as urban sprawl development. The incompatible residential models and uncontrolled GHPs growth in sprawl phenomena lead to spatial isolation, environment and social impacts on locals and new residents. These result in reduction of communities' well-being and unification in provincial scale. As mentioned above, we can realize that GHP development has been regarded as one of the serious issue to study sprawl area in BMR. This research aims to evaluate effects related to GHP on surrounding communities towards investigation of causes, leading to guideline to improve future GHP development. The prospected goal of research is to create unification among residents in mixed types of residential areas through reducing social impact of GHP development in suburban residential area.

Therefore, it is necessary to create specific evaluation method for BMR context in order to examine the effects of GHP as explicit as possible. The primary effects of GHP development are range from urban development to social relationship of inhabitants. Thus, the effect evaluation in this research included; urban scale to classify problematic area; district scale to understand current situation of study area; and community scale to investigate social relationship's effect of inside and outside residents of GHP. All results should be considered simultaneously to appreciate all feedbacks that can reflect the guideline to improve GHP.

To achieve goal of study, major four parts conduct the research as follow; investigation of sprawl phenomena in BMR, evaluation of effects of GHP, results analysis and discussion, and conclusion and recommendation for future GHP. At the first part, the principle effects of GHP development in sprawl phenomena of BMR are revealed that the main problems are urban development and social relationship of inhabitants. This sprawl area is measured by factors that are combined literature review and condition of sprawl in BMR. The index of sprawl measurement is used as a key of evaluation method to classify

sprawl area into four stages of sprawl development. The findings of this part are problematic areas and characteristic of GHP allocation in each category. Therefore, the case studies are selected regarding the most severe areas, and are evaluated the effects concerning the revealed principle problems. These contents are described from Chapter I to III.

After comprehension of GHP situation in urban scale was exposed in the Part I, the second part of dissertation described about effect evaluation of GHP development in case study areas. The representative sprawl areas are chosen in Pathumthani and Nonthaburi province where high accumulation of GHP has. Both areas are expected that have high impact on social relationship because of disorder and congestion of GHP in residential area.

Chapter IV will clarify specific indices of neighborhood relationship evaluation of GHPs and method to consider current situation in sprawl case study. The tools and methods of questionnaires survey and physical observation will be designed. Chapter V and VI are conducted with the same structure as follow; background of area, characteristics of current land composition, neighborhood relationship assessment, and data analysis. According to physical observation on existing situation, there are diverse communities including; former village (FV), gated housing project with detached houses (GHP-D), gated housing project with townhouse (GHP-T), housing project with no-gate (HP), and individual house (IH) in both cases. In addition, we found the differences of GHPs' location in residential land composition are congestion of GHPs in Pathumthani and dispersion of GHPs in Nonthaburi. This condition leads to problems on quality of living on surrounding communities such as traffic congestion in dense GHP development area and encroachment on agricultural lands in disordered GHP development area. This situation emphasizes possible effects on social relationship of inhabitants. The social relationship for inside and outside residents is assessed directly through 400 questionnaires in each study area. Moreover, the supply-side of GHP development (developers and local governmental officers) is also important to be inquired via structural interviews. The results from questionnaires distribution are calculated via SPSS program to clarify respondents' perception and opinion. We found that characteristics of respondents in both cases are different. Moreover, FVs in Nonthaburi, have lowest outside relationship (OR) but highest inside relationship (IR), while GHP-Ts have highest OR but lowest IR. On the other hand, FVs in Pathumthani have highest IR and OR, and GHP-Ts have lowest OR.

Part III includes comparison analysis and tendency analysis of results from questionnaires in Chapter VII in order to investigate; the relevant factors related neighborhood relationship, and explanation of causes of that relationship. The discussions will be supported by the supportive results from interviews and field survey. When compared inside and outside neighborhood relationship between congested GHP area and disordered GHP area, the common results are similarity of IR and OR of GHP-D and HP in both cases. Meanwhile OR of FV and GHP-T is totally opposite results, namely, FV in congested GHP area has strongest OR but becomes weakest in disordered GHP area. Contradiction, OR of GHP-T is highest in disordered GHP area and lowest in congested GHP area. As the supportive results from physical observation, IR of FVs cannot be reduced by encroachment of GHPs in both areas, except strength of OR depends on GHPs allocation. The disorganized GHP allocation caused the isolation of FVs, which led to the dissatisfaction of

FVs on polluted agricultural lands and obstructive accessibility. Although walls of surrounding GHPs enclose FVs in congested residential area, but accesses of FVs directly connect to the main road. The relevant factors that influenced on neighborhood relationship are analyzed through ANOVA and T-Test analysis. The analysis can affirm that physical environment of community and characteristic of residents significantly influence on social relationship. The common influenced factors are length of occupancy and gates or fences of GHP. The different influenced factors are size of household, income, and age of residents. These significant related factors can create points of recommendation that will be suggested in the next chapter.

Conclusion and recommendation is exposed in Part IV within Chapter VIII. In summary, gated housing project development is a key driver of sprawl phenomena in Bangkok metropolitan region. The principle effects from GHP development in residential scale are; community isolation, land use confusion and encroachment, and traffic congestion. As the pre-evaluation of effects in urban scale, there are four types of sprawl area. The most critical area consists of accumulative GHP diffusion with inefficient infrastructure and weak land use planning. In district scale of case study areas, the isolation of community is obviously found in Nonthaburi area, while there is less social segregation in Pathumthani. In community scale, the adapted GHP can create better social relationship than typical GHP. However, it is still not enough to make unification in community. The community without restrict access also has stronger inside relationship. Therefore, the current physical condition of GHP should be more reconsidered because they cannot enhance the social relationship inside GHP. For the influenced factors that are found in previous chapter, can generate basis recommendations for future GHP development. In real situation, we cannot immediately stop GHPs' growth and cannot eliminate entire walls of GHPs. This research expects to suggest; (1) local government policy should pay more attention on GHP's location to determine the appropriate zone that makes fewer effects from GHPs mentioned above, (2) it is better to provide amenity or management system for longer period of occupancy because the long period of living can create strong social relationship among the residents, (3) gates and fences can be reduced extravagance design of gates and fences to humble the surrounding community's perception, and (4) revision the current community management system in GHP. As the recommendation, this is expected to be an initiative point to improve gated housing projects and towards create the unification in residential area in the future.

## CONTENTS

<b>CHAPTER I Introduction</b>	<b>1</b>
1.1. Introduction of Gated Housing Project Development Study	1
1.2. Problematic consequences from Gated Housing Project Development	3
1.3. Background of the Study	4
1.3.1. Study of Impact of Rapid Urbanization	5
1.3.2. Emerging of Haphazard urbanized areas in Bangkok Metropolitan Region	7
1.3.3. Expansion of Modern Low-rise Housing Project Development	9
1.3.4. Situation of Gated Housing Development in Bangkok Metropolitan Region	15
1.3.5. Study of Social Interaction	18
1.4. Originality and Contribution of the Study	19
1.5. Objectives and Research Framework	23
1.6. Research Methodology	24
1.7. Structure of Dissertation	26
1.8. Terms of Definition	28
References of Chapter I	33
 <b><i>PART 1 Pre-Evaluation for Identification of primary effects and problematic areas in urban scale</i></b>	 <b>35</b>
 <b>CHAPTER II Gated Housing Project Development in Sprawl Phenomena of Bangkok Metropolitan Region</b>	 <b>37</b>
2.1. Introduction	37
2.1.1. Background	37
2.1.2. Objectives	38
2.1.3. Research method and Analysis	39
2.2. Emerging sprawl phenomena in BMR	39
2.2.1. Causes of sprawl situation in BMR context	42
2.2.2. Effect of sprawl development	46
2.3. Gated Housing Development in BMR	47
2.3.1. General Gated Communities (GCs) study	47
2.3.2. Types of Gated Communities	49
2.4. Findings and Conclusion	52
References of Chapter II	54

<b>CHAPTER III Sprawl Classification in Bangkok Metropolitan Region Context</b>	<b>57</b>
3.1. Introduction	57
3.2. Literature review of Sprawl Measurement	58
3.3. Indicators of sprawl measurement in BMR context	59
3.4. Identification of sprawl area in Macro scale	62
3.5. Characteristic of sprawl area and Classification of sprawl state in Micro scale	64
3.6. Gated Housing Projects' Diffusion in sprawl classification	71
3.7. Contribution for next Part of research: Case study area selection	74
3.8. Findings and Conclusion	75
References of Chapter III	77

***PART 2 Effect Evaluation of social relationship and existing situation in district and community scale*** **79**

<b>CHAPTER IV Evaluation of Neighborhood Relationship for inside and outside residents of Gated Housing Project Development</b>	<b>81</b>
4.1. Introduction	81
4.2. Measurement of Neighborhood relationship in BMR	82
4.3. Research design and Data collecting tools	84
4.3.1. Physical Environment Observation	86
4.3.2. Questionnaires	87
4.3.3. Structural Interview	98
4.4. Findings and Conclusion	100
References of Chapter IV	102

<b>CHAPTER V Neighborhood relationship assessment in Residential area with congested GHP settlement in Pathumthani province</b>	<b>105</b>
5.1. Introduction	105
5.2. General overview of Khlongluang district, Pathumthani province	106
5.2.1. Site context, topography and land use	106
5.2.2. Residential Development in study area	112
5.2.3. Current situation and problems	114
5.3. Questionnaires survey for inside and outside communities	116
5.3.1. Characteristic of respondents in case study area	117
5.3.2. Evaluation of Neighborhood Relationship	118
5.4. Attitude of external stakeholder (developers and local government officers)	129

5.5. Findings and Conclusion	131
5.5.1. Physical Environment in district	131
5.5.2. Characteristics of 5 types of communities and neighborhood relationship	132
References of Chapter V	137

<b>CHAPTER VI Neighborhood relationship assessment in Residential area, with disorder GHP settlement in Nonthaburi province</b>	141
6.1. Introduction	141
6.2. General overview of Bangyai district, Nonthaburi province	142
6.2.1. Residential Development in study area	145
6.2.2. Current situation and problems	148
6.3. Questionnaires survey for inside and outside communities	148
6.3.1. Characteristic of respondents in case study area	148
6.3.2. Evaluation of Neighborhood relationship	151
6.4. Attitude of external stakeholder (developers and local government officers)	163
6.5. Findings and Conclusion	163
6.5.1. Physical Environment	164
6.5.2. Inside and Outside neighborhood relationship	165
References of Chapter VI	168

<b>PART 3 Statistic Analysis of effects evaluation of Gated Housing Project Development to examine influenced factors</b>	171
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<b>CHAPTER VII Analysis of Effect Evaluation on neighborhood relationship and physical environment</b>	173
7.1. Introduction	173
7.2. Tendency Analysis	173
7.2.1. Congested GHP development area: Influenced Factors of Inside and Outside Neighborhood Relationship	176
7.2.2. Disordered GHP development area: Influenced Factors of Inside and Outside Neighborhood Relationship	186
7.3. Comparison Analysis in district scale	195
7.4. Conclusion of Findings	197
References of Chapter VII	198

**PART 4 Conclusions of effects by Gated Housing Projects Development towards  
basis guideline for future development** 203

<b>CHAPTER VIII Conclusion and Recommendation</b>	205
8.1. Summary of findings in each chapter	206
8.2. Discussion on overall findings	211
8.3. Recommendations	214
8.3.1. For private and public sector	214
8.3.2. For existing GHP in study area	216
8.4. Future works	217

## LIST OF FIGURES

Figure I 1: Change of Transportation in Bangkok	6
Figure I 2: Transportation change in Bangkok and greater area	7
Figure I-3: Litchfield Greater Bangkok Plan (1950 – 1990) and	8
Figure I-4: Comprehensive Land Use plan of BMR	10
Figure I-5: Low density of residential area in BMR	10
Figure I-6: Housing market in BMR	11
Figure I-7: Typical elements of gated housing projects in BMR	15
Figure I 8: Location Analysis of GHP in BMR	16
Figure I-9: Situation of GHP in B-2 area of BMR	17
Figure I-10: The positioning of this study	19
Figure I-11: Research Framework	23
Figure I-12: The research flow	25
Figure I-13: Structure of dissertation	27
Figure I-14: Terminology of Effect Evaluation in this research	29
Figure I-15: Gated Housing Project Development	30
Figure I-16: Neighborhood relationship assessment in this research	31
 Figure II-1: Structure of Chapter II	 38
Figure II-2: Urbanization areas diffusion in Bangkok and greater area (1930-2010)	41
Figure II-3: Sprawl situation in different context	43
Figure II-4: Residential land use of BMR	43
Figure II-5: Lacking of modernized residential plans and regulations	44
 Figure III-1: Structure of Chapter III	 57
Figure III-2: Sprawl measurement process in BMR context	60
Figure III-3: Location of sprawl and Non-sprawl Area in BMR	63
Figure III-4: Factors for sprawl qualification by mesh data analysis	65
Figure III-5: 12 groups of sprawl land use	66
Figure III-6: 12 groups on DLU, DD, and EI factor	67
Figure III-7: 4 Types of sprawl and GHP's diffusion in sprawl classification	73
Figure III-8: Case study selection	74
 Figure IV-1: Data collection and tools	 81



Figure IV-2: Concept of evaluation of social effect	85
Figure IV-3: Structure of questionnaire	87
Figure IV-4: Questionnaire Sheet page 1	94
Figure IV-5: Questionnaire Sheet page 2	95
Figure IV-6: Questionnaire Sheet page 3	96
Figure IV-7: Questionnaire Sheet page 4	97
Figure IV-8: Questionnaire Sheet page 5	98
Figure IV-9: Structure of questionnaire and results reporting	101
Figure V-1: Land use and Canal system of Pathumthani province	110
Figure V-2: Characteristic of Gated housing project and Land composition	111
Figure V-3: Road access to housing project and former village	112
Figure V-4: Five types of community in study area	113
Figure V-5: Overall problems in study area	115
Figure V-6: Outside Activity Map	128
Figure V-7: Adapted GHP in Pathumthani	134
Figure VI-1: Land use and canal system of Nonthaburi province	144
Figure VI-2: Five types of community in study area	145
Figure VI-3: Characteristic of Gated housing project and Land composition	147
Figure VI-4: Problems during Physical Observation	149
Figure VI-5: Outside activity map	162
Figure VI-6: Disturbance of accessibility	164
Figure VII-1: Level of inside and outside relationship in five types	178
Figure VII-2: Comparison of correlated factors in type of community	179
Figure VII-3: Comparison of Gate and No-Gate	180
Figure VII-4: Comparison of Guard and No-Guard	180
Figure VII-5: Means of IFE in size of household	181
Figure VII-6: Means of FON in family income	182
Figure VII-7: Means of IFE, SEC, OR in Length of occupancy	183
Figure VII-8: Means of OR and IFE in Age of respondents	184
Figure VII-9: Influenced factors on inside and outside relationship	185
Figure VII-10: Level of inside and outside relationship in five types	187
Figure VII-11: Comparison of correlated factors in type of community	188
Figure VII-12: Comparison of Gate and No-Gate	189

Figure VII-13: Comparison of Guard and No-Guard	190
Figure VII-14: Means of FON in size of household	190
Figure VII-15: Means of FON in family income	191
Figure VII-16: Means of MBS and SEC in Length of occupancy	192
Figure VII-17: Comparison of Gate and No-Gate	193
Figure VII-18: Influenced factors on inside and outside relationship	194
Figure VII-19: Comparison of Inside – Outside neighborhood relationship	195
Figure VII-20: Overall Inside – Outside neighborhood relationship	196
 Figure VIII-1: Pattern of GHP attachment	 209
Figure VIII-2: Pattern of GHP attachment	210

## LIST OF TABLES

Table I-1: Actual populations of the largest cities of Southeast Asia	5
Table I-2: Housing Estate Development	13
Table I-3: Previous works on Gated Housing Development	21
Table II-1: Building coverage and Existing land use development in 1782 – 2007 of Bangkok	40
Table II-2: Bakely and Snyder's (1997) general typology of gated community	50
Table II-3: Classifying gated communities through a continuum of 'enclosure'	51
Table III-1: Factor for measurement sprawl development and its utilization	61
Table III-2: Location and Level of Sprawl Area in BMR	69
Table III-3: Population growth in BMR	75
Table III-4: Characteristic of different type of sprawl in BMR	75
Table IV-1: Categories of five types of communities	85
Table IV-2: Interpretation of Questions of neighborhood relationship measurement in questionnaires in Part 1-2	88
Table IV-3: Structure of interview and interpretation for Developers	99
Table IV-4: Structure of interview and interpretation for Local Governmental Officers	99
Table V-1: Land use in Pathumthani province (Land use in hectare)	106
Table V-2: Change of Land use from Agricultural to Built-up Area	107
Table V-3: Characteristic of Respondents in Khlongluang district	117
Table V-4: Means of chosen answers in FON and OR factors	119
Table V-5: Answers of Membership in bar chart of percentage	120
Table V-6: Answers of Influence's questions in bar chart of percentage	122
Table V-7: Answers of Integration and Fulfillment of Needs in bar chart of percentage	122
Table V-8: Answers of Shared Emotional Connection in bar chart of percentage	124
Table V-9: Answers of Outside Relationship in bar chart of percentage	126
Table V-10: Opinion of a representative of private developer	129
Table V-11: Opinion of a representative of local governmental officer	130
Table V-12: Significant characteristic related with inside and outside relationship	132

Table V-13: Nature of GHP in Pathumthani case	134
Table VI-1: Population growth in BMR	142
Table VI-2: Characteristic of Respondents in Bangyai district	150
Table VI-3: Answers of Membership's questions in bar chart of percentage	152
Table VI-4: Answers of Influence's questions in bar chart of percentage	153
Table VI-5: Answers of Integration and Fulfillment of Needs in bar chart of percentage	155
Table VI-6: Means of chosen answers in FON	156
Table VI-7: Answers of Shared Emotional Connection in bar chart of percentage	156
Table VI-8: Answers of Outside Relationship's questions in bar chart of percentage	159
Table VI-9: Means of chosen answers in OR	160
Table VI-10: Significant characteristic related with inside and outside relationship	165
Table VI-11: Nature of GHP in Nonthaburi case	166
Table VII-1: Independent Factors	175
Table VII-2: Dependent Factors	176
Table VII-3: Summary of Inside and Outside Relationship – Type of Community	177
Table VII-4: ANOVA analysis between Type of Community and Neighborhood Relationship	178
Table VII-5: T-Test analysis between Gate/Non-Gate and Neighborhood Relationship	179
Table VII-6: T-Test analysis between Guard/Non-Guard and Neighborhood Relationship	180
Table VII-7: ANOVA analysis between Size of Household (SOH), IR, and OR	181
Table VII-8: ANOVA analysis between Family's Income (FIN), IR, and OR	182
Table VII-9: ANOVA analysis between Length of Occupancy (LOO), IR, and OR	183
Table VII-10: ANOVA analysis between Age (AGE), IR, and OR	184
Table VII-11: Summary of Inside and Outside Relationship – Type of Community	186
Table VII-12: ANOVA analysis between Type of Community and Neighborhood Relationship	187
Table VII-13: T-Test analysis between Gate/Non-Gate and Neighborhood Relationship	189
Table VII-14: T-Test analysis between Guard/Non-Guard and Neighborhood Relationship	189
Table VII-15: ANOVA analysis between Size of Household (SOH), IR, and OR	190

Table VII-16: ANOVA analysis between Family's Income (FIN), IR, and OR	191
Table VII-17: ANOVA analysis between Length of Occupancy (LOO), IR, and OR	192
Table VII-18: ANOVA analysis between Age (AGE), IR, and OR	193
Table VII-19: Conclusion of findings	197
 Table VIII-1: Summary of findings in Part 1	 207
Table VIII-2: Summary of findings in Part 2	208
Table VIII-3: Summary of findings in Part 3	211
Table VIII-4: New findings of effects of GHP in this research	212

### **1.1. Introduction of Gated Housing Project Development Study**

This research focuses on effect of gated housing project (GHP) development in sprawl area of Bangkok Metropolitan Region (BMR), Thailand, through neighborhood relationship evaluation on residents inside GHP and surrounding communities. The issues about residential problem still have been paid attention by many researchers in socio-economics, urban planning, built-environmental design, and so on. Most of them have similar intention to improve the living quality of residents in those residential projects. The type of residential has been developed with the long-standing period based on the contexts of each city. In the case of Southeast Asian countries, the capitalism leads to accumulation of wealth and consequences in huge income gaps. This results in demand of the affluent in their properties protection by private or common fortification and security guards that almost completely duplicated the American housing model (Leisch, 2002), called Gated Housing Projects (GHPs) or Gated Communities (GCs) in America. Because the continuing demand of this residential style exists in the future developing area, particularly in greater areas of BMR, which has a weak urban planning and misused land use development. The incompatible residential models and uncontrolled GHPs growth lead to spatial segregation, environmental and social effects on locals and new residents. When the effects could be reduced, the unity of different communities in a district would be formed and lead to social capital, which links with communities' well-being. The sense of community, as a primary construction of generated social capital, can be enhanced through geographic and relational sense that was confirmed in neighborhood study (Lochner, Kawachi, & Kennedy, 1999). Therefore, built-environment of GHPs influences on neighborhood relationship and community planning in the future. The social effect of GHPs has been regarded as one of the serious issue to study in sprawl area in BMR.

Even though, GCs study is not the new issue in Western countries, it is quite a new conversation about modern residential style in Asian countries in the last decade. The occupying Romans in England built the earliest gated communities around 300 B.C but these early-gated preserves were different from the gated

subdivisions of today. The Western GCs researches examined various dimensions of effect of GCs such as political, economic, health, and social aspects. In term of theoretical community design, gated community supposed to preserve and strengthen neighborhood bonds because it reflects to varying social values (including a sense of community). Where sense of community is a primary value motivating the residents of gated communities, it reflects all elements of community (Blakely & Snyder, 1938). Although, there are both sides of advantages and disadvantages of the current GCs development, those researches concerned about quality of living 'inside' gated communities (Low, 2003; Sakip, Johari, & Salleh, 2012) or 'outside' effects in regional scale (Goix, 2006). On the other hand, general ideas about Asian housing development are about residential for low-income, slum, and traditional houses. While the higher demand of GCs has been continuing increased, but the number of GCs research in Asian cities is much lower than in Western. In spite of the original reason, the rise of GCs in Western and Asian cities have similarity, namely, property values and security were far more important to most purchasers than 'community' (Blandy & Lister, 2006; Leisch, 2002; Hapsariniaty, Sidi, & Nurdini, 2013). In Asian cases, incompatible implementation of residential style without consideration of different context possibly lead to unsatisfactory consequences. Particularly, Bangkok Metropolitan Region with misused land use and weak urban planning is an attractive case to pay attention on the effect of GHPs development in terms of social relationship of inside and outside residents of the gates.

The main idea of this study is about the effect of gated housing project development in sprawl area, particularly analysis of social relationship. The inside-outside neighborhood relationship measurement reflects; 1) clarification neighborhood relationship between GHPs and surrounding communities; 2) exposure of the relevant factors to suggest how to develop future gated housing projects to reduce social effect on inside and outside residents and to empower their relationship. So, this study will examine current situation of sprawl phenomena in BMR in order to clarify the critical sprawl areas as the case study areas, and to understand land composition that includes GHPs and other communities in the same areas. Then the neighborhood relationship of residents in GHPs and surrounding communities will be measured through questionnaires distribution and supportive interviews. The results will be analyzed the difference of relationship in different environment of communities to understand the important factors towards relationship improvement. This chapter will explain the overall research including background, originality, objectives, methodology, and structure of research.

## 1.2. Problematic consequences from Gated Housing Project Development

Many gated housing project studies (Low, 2003 and Blakely et al, 1999) in western countries support this model of residential development that provides high quality of residential environment and integrating social cohesion within community. In the same time, there are unintended problems especially in Asian cities. The problems are variety, depending on context of CCs and different causes. However, GHP researches in this century have started to criticize GHP development in various perspectives, there are few studies have seriously evaluated the effects of GHP. Therefore, this research focuses on negative effects of GHP development in order to improve and upgrade future GHP in Bangkok Metropolitan Region. Hence the systematic effect evaluation is important in this study because the clear determinants of problems can lead to practicable solutions.

In Asian context, the physical style of GCs is duplicated from western model without well-consideration (Leish, 2002). Particularly the city that lacks of effective housing regulation and urban planning such as Bangkok Metropolitan Region, the effects easily occur on quality of living in residential area. Kessupa (1985) founded gated housing projects (GHP) have originated in urban fringe of Bangkok city (10 – 20 kilometers from city center) since 1973 and expanded to the eastern and northern suburban area (over 20 kilometers from city center). They located along the main roads that connected from city center to sub-center. Moreover, she found emerging of new road network in suburban area related to GHP growth because the land cost was cheaper and low density. While there are low effective urban plan from government, GHP have distributed haphazardly in suburban residential area. Therefore, key of rapid urbanization is population growth that motivates demand of housing development. GHP is an important driver that responses the residential increase, particularly in flourishing period of housing development since 1979. This situation in BMR causes effects from uncontrolled growth of GHP. This section introduces basic problems of GHP from this situation.

### 1) Increasing of private cars usage:

Major location of GHP is remote from Bangkok city that is an employment center. The GHPs located along the main roads and local roads that seem to be convenient for residents but public transportation has been late developed. Consequently, demand of private automobiles has been increasing. This leads to traffic congestion in suburban area that wastes time and fuel energy.

### 2) Subsidence, flooding, and water pollution in residential area:

Suburban area of BMR is high-density area of GHP; additionally the infrastructure such as water supply system is not prompt. Developers need to provide ground water for some housing projects. This situation causes subsidence of earth in



that residential area. In some suburban residential areas, location of GHP obstructs natural water drainage that leads flooding in rainy season. Although water treatment system is determined in standard of GHP, some developers carelessly release wastewater into public canals or abandon areas. That makes pollution in residential environment and surrounding communities.

3) Disorderliness of urbanized area expansion:

This problem causes by lacking of long-term urban plan, ineffective residential regulation, lacking of coordination in relevant public organization, and less responsibility of private sector. The consequence of this situation is insufficient service of public facilities that pushes residents use facilities in the city center.

4) Confusion of land use:

The congestion of GHP also leads demand of commercial activities in that area. We frequently find the local services in shophouses along the main road. Although it seems to be similar to idea of compact city, those services are not planned and originated by inhabitants. Thus it causes annoyance and bottleneck to residents who live nearby this commercial area. Moreover, the encroachment of GHP on agricultural land use in suburban area is increase because low land cost and road network distribution. This condition brings about losing of good agricultural area and effects on local occupation.

5) The defects in land allocation act and relevant regulation of GHP:

Although there are regulations to control standard of housing project development, developers often avoid reaching that standard because of saving the budget. Especially, developers of small GHP projects abstain from providing common utilities within GHP through defect of regulation. This leads to residents in GHP receive lower standard of utilities, at the same time, inhabitants outside GHP gain environmental problems.

As the primary problems mentioned above, the effects may emerge on urban scale, district scale, and community scale that is not only residents inside GHP but also existing communities. We can recognize that GHP development in suburban residential area has been regarded as an urgent issue.

### **1.3. Background of the Study**

This section describes approach of research through literature review of some basic conversations about effects of rapid urbanization in BMR context; namely, raise of sprawl development that influence on speedy land use transformation and expansion of low-rise housing development. It will enhance the importance of Bangkok Metropolitan Region as one of the serious cases of gated housing project developments study.

### 1.3.1. Study of Impact of Rapid Urbanization

**Table I-1: Actual populations of the largest cities of Southeast Asia**

Country	Population (million)		Annual growth rate (percent per annum)		Global rank	
	1990	2000	1985-90	1990-2000	1990	2000
Jakarta, Indonesia	9.3	13.7	4.4	3.7	14	10
Manila, Philippines	8.5	11.8	3.5	3.2	20	19
Bangkok, Thailand	7.2	10.3	4.0	3.5	24	21
Yangon, Burma	3.3	4.7	3.3	3.5	60	49
Ho Chi Minh, Vietnam	3.2	4.1	1.7	2.6	61	60
Bandung, Indonesia	2.5	3.6	3.7	3.5	83	75
Surabaya, Indonesia	2.4	3.4	3.4	3.4	89	83
Singapore	2.7	3.0	1.3	0.8	78	101
Medan, Indonesia	1.8	2.7	4.0	3.7	126	114
Kuala Lumpur, Malaysia	1.7	2.6	5.8	3.8	137	117

(Source: UN Population Division, 1990)

Asian Metropolitan Cities have been an explosive increase the growth of urbanization and population in the post-war decade. As Southeast Asian cities, the three largest cities; Jakarta, Manila, and Bangkok, are exceed 10 million by 2000, while another seven will have populations in excess of 2.5 million in table 1. The history of capitalism in Southeast Asia is one of the history of urbanization, and the accelerated growth of large cities. That is the very distinctive form of spatial organization of a society. The distribution of population is expected to adjust to the needs of economic growth. The most Southeast Asian countries give to industrial development, this inevitable means a continuing pattern of urbanization, which is not the same thing as continued growth of the metropolis. The key problems facing the metropolis could be very long indeed. They are to indicate four main ones that are 1) migration, urbanization and population distribution 2) cities as agents of change 3) industrialization, and 4) quality of life (Forbes 1996). Most of Asian cities have attempted to keep growth under control and encourage well-ordered developments by applying urban planning concepts that were originated in western nations. There are several successful experiences in some Asian cities, but in most cases, the attempts should be regarded less than successful (Yokohari, et al. 2000).

This movement causes by rapid urban development in an age of globalization because we are witnessing the emergence of the maturation of an exploitive capitalist system. The central business district (CBD) encourages greater numbers of people to live in urban areas as office work or employment center replaced many farmer jobs in rural area (Hampton 2010). When the density in city center reached the peak, the technological development of passenger trains and trams generated sub-centers surrounding the urban area. This technological development coincided with massive urbanization throughout of Europe, America, and Australasia. However, those transit systems are no longer in use today, especially in Southeastern Asia. The technological

development of the automobile becomes the dominant form of development after the Second World War. Newman (1992) has identified that the automobile progressively became the transport technology that shaped the city. Even if the rapid urbanization is a cause of many changes in modern world, the countries that have well preparation and planning seem to readily cope with the consequences. Therefore, the countries in Southeastern Asia should be paid more attention because their economic have been continuing grown and being the target of international investors during this decade. As shown in the vision of AEC (ASEAN Economic Community) that the AEC is the realization of the end goal of economic integration as espoused in the Vision 2020, which is based on a convergence of interests of ASEAN Member Countries to deepen and broaden economic integration through existing and new initiatives with clear timelines. The infrastructure and urban development will be provided for this huge movement of ASEAN economic. As shown in Table I-1, Bangkok is as one of three the largest city of Southeast Asia, and it is a good example of city mainly shaped by the infrastructure for automobiles that response rapid urbanization.



**Figure I-1: Change of Transportation in Bangkok**

The city was established for 178 years and its geography consists of many rivers and canals, hence, the main transportation was water transportation system. This transformation of transportation made evolution of city is an attractive area. Even if mention to history of sprawl development in Bangkok occurred in King Mongkut (Rama IV) era who reigned between 1851-1868, and adopted western culture into Thai culture. During cultural combination, making people focused on civilization from western countries and make image of Ratanakosin city (former name of Bangkok) as representative modern and greater city. This is a result of expansion of boundary of the city into the East and North side. However, significant evidence as transition period is in King Chulalongkorn (Rama V, 1868-1910) saved Thailand from western colonization through adroit diplomacy and selective modernization. Moreover, this is the first time that road network was constructed and became the main transportation instead of water way such as boat or pillar in Chao Phraya River (Figure I-1). Then the city was

developed as western urban development. Thai government collaborated with American company created the first urban planning of Bangkok in 1960. The consequences of development suppose to be great, if the urban planning could promptly developed with real situation. The expansion of urban area is substantially uncontrolled because it was late to try to control because the city was established over 80 years before and there was already expanded unplanned area. In addition, the controls specified by the act are quite lax. Land use categories are the only issue under supervision (Yokohari, et al. 2000). Therefore, the effect of this rapid phenomenon in Bangkok and greater area has been regarded as one of serious cases of living condition changes.

### 1.3.2. Emerging of Haphazard urbanized areas in Bangkok Metropolitan Region

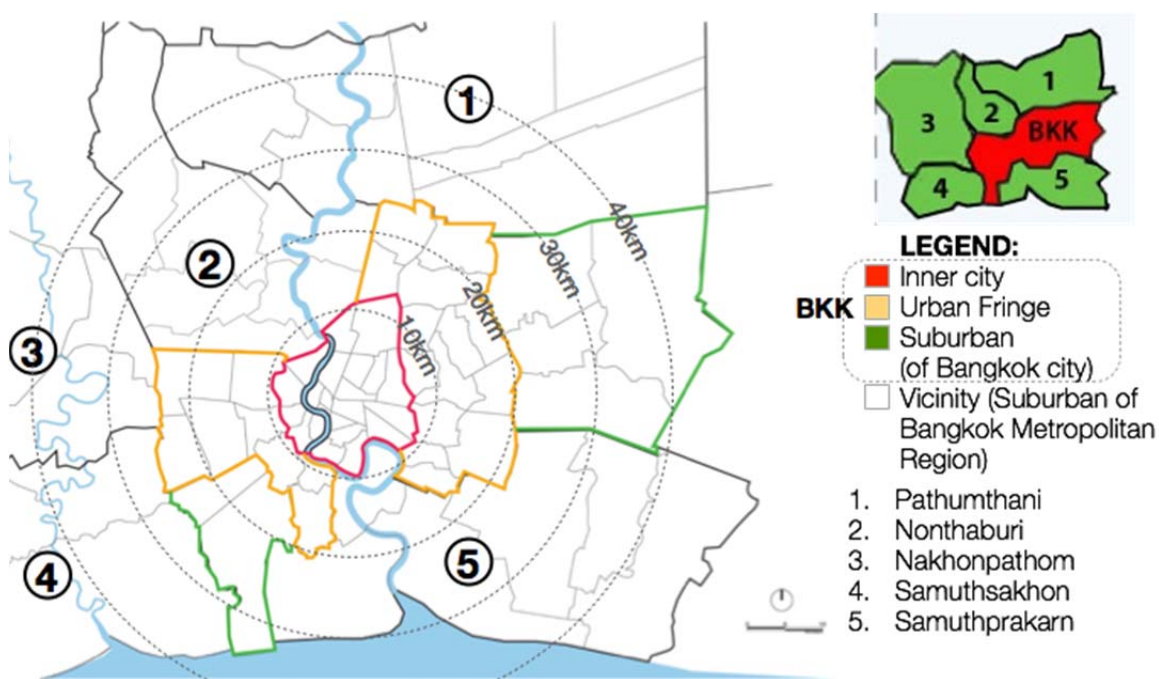


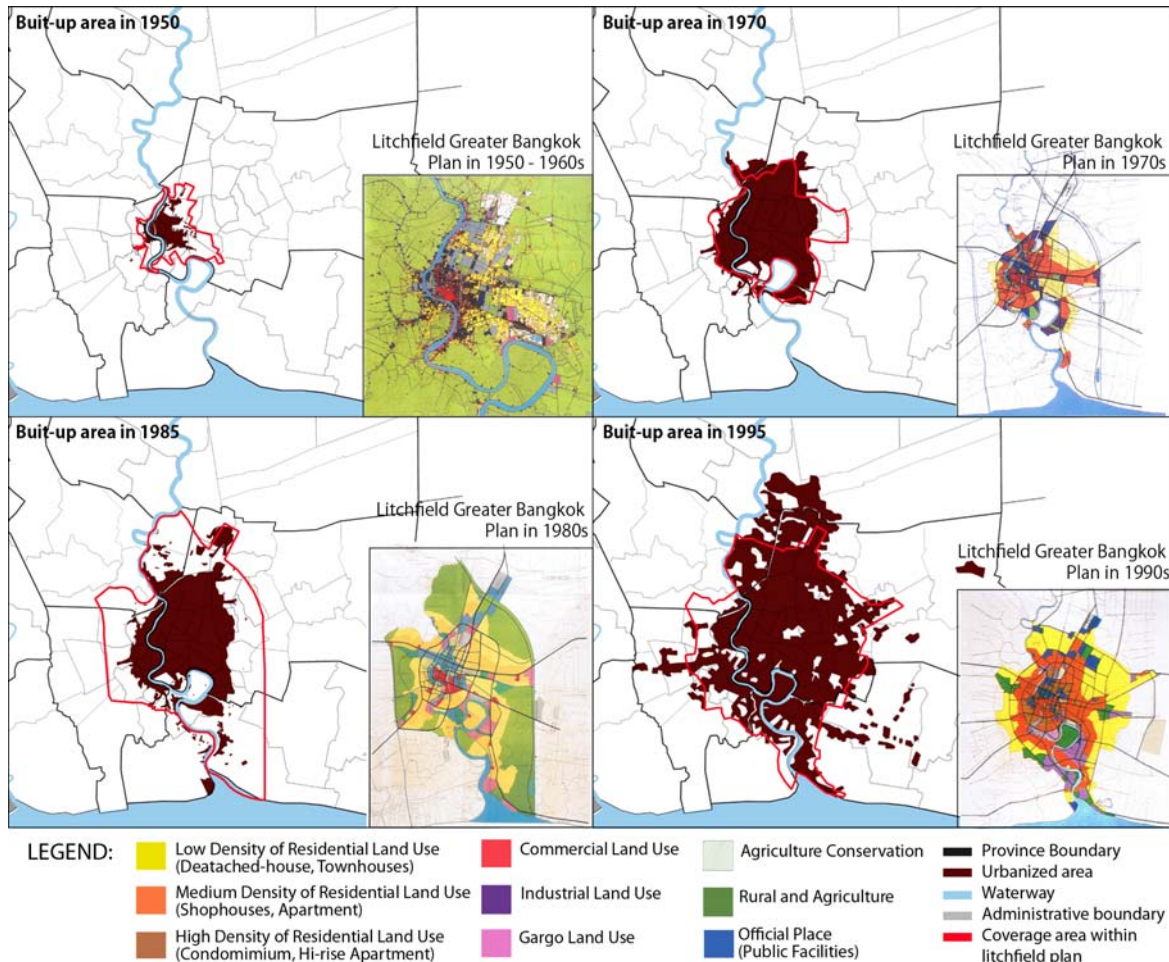
Figure I-2: Transportation change in Bangkok and greater area

(Source: author, 2012)

According the expansion of urban area is substantially uncontrolled as mentioned above, hence, the urban plan and policy were applied to cover growth of Bangkok city and greater area, called Bangkok Metropolitan Region (BMR)<sup>1</sup> The total population in BMR is approximately 10.7 million within an area of 7,761.6 km<sup>2</sup> (Figure

<sup>1</sup> Bangkok Metropolitan Region (BMR), as the national plan, includes 6 administrative provinces are; 1) Bangkok city: 1,568.737 km<sup>2</sup>, 5,702,595 people, 2) Nakhonpathom: 2,168.327 km<sup>2</sup>, 851,426 people, 3) Nonthaburi: 622.303 km<sup>2</sup>, 1,078,071 people, 4) Pathumthani: 1,525.856 km<sup>2</sup>, 956,376 people, 5) Samuthprakarn: 1,004.092 km<sup>2</sup>, 1,164,105 people, and 6) Samuthsakorn: 872.347 km<sup>2</sup>, 484,606 people. Total BMR area is 7,761.662 km<sup>2</sup> and number of residents is 10,237,179 people. It consists of 69 counties in total. Source: <http://th.wikipedia.org/wiki/กรุงเทพมหานครและปริมณฑล>

I-2). Therefore, the larger scale of urban area, the seventh national economic and social development plan (1992-1996) from government was launched, the outskirts area obtained extreme infrastructure network.



**Figure I-3: Litchfield Greater Bangkok Plan (1950 – 1990) and Diffusion of built-up area**  
(Source: author, 2011)

Although the aims of this development plan is an preparation for private sector development, this becomes “over-urbanized” which developers constructed housing development projects flowing in suburb area along the road network as ribbon development (Figure I-3). The main transportation of BMR is an automobile because of deficiency of skytrains and inefficiency of railways. The automobile made low-density housing feasible, as people were no longer forced to live either near their place of employment or a transit station to transport them to there. This situation raise to overwhelming residential development in surrounding area of BMR by private developers. Particularly, those areas have no strong urban planning to readily cope with this condition; it easily overlapped on many paddy fields area and led to



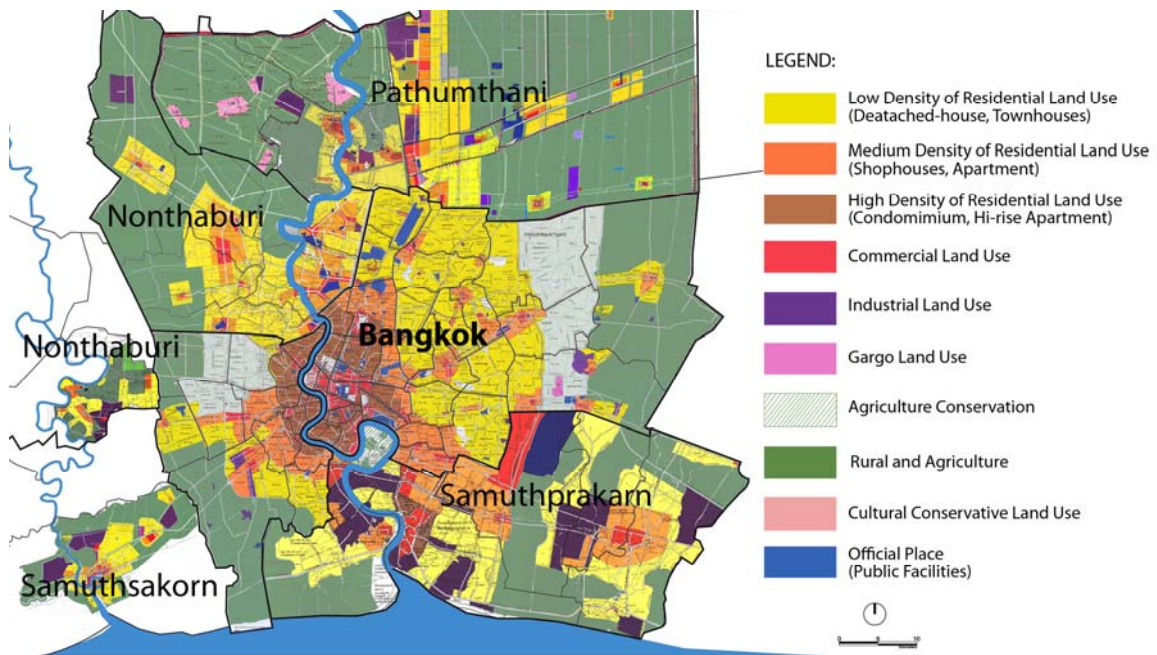
several dimension problems to former citizen. Consequence, this caused many problems such as traffic, extravagant expenses for living and traveling, higher density of residential building, and land size limitation or residential landform. (National economic and Social Development Board office of the Prime Minister Bangkok,1992). Although, both national plans and urban planning policy strived to control city growth, but many areas were developed consequently that excluded from the plan. This led to out of control development that made misuse of land use in suburb.

When we considered this phenomenon of BMR mentioned above, we could assume sprawl development has been emerging in BMR through haphazard development of residential development by private sector (Land readjustment and new town project devision DTCP 1999). Even though there is no common definition of sprawl, but definition of sprawl in terms of pattern and land development nearly close to characteristic of BMR situation. Sprawl is a continuous low-density residential development on the metropolitan fringe, low-density ribbon development along major suburban highways, and leapfrogs development to leave a patchwork of developed and undeveloped lands (George, et al. 2000). The effect of sprawl development is broadly examined because it is an international issue of urban planners. However, those findings are different based on context of areas, the way to measure and the causes of sprawl are specific on that site. In BMR context, the sprawl development relates with land use development caused by weak urban planning and imbalance between residential development and city planning. The results range from loss of farmland to decay of older urban center. It requires government to further spend millions extra to support new public facilities. These are samples of disadvantages to urban and community scale. Therefore, the land use transformation in sprawl area by replacing low-density of residential projects is important to be investigated the factors of this phenomena.

### **1.3.3. Expansion of Modern Low-rise Housing Project Development**

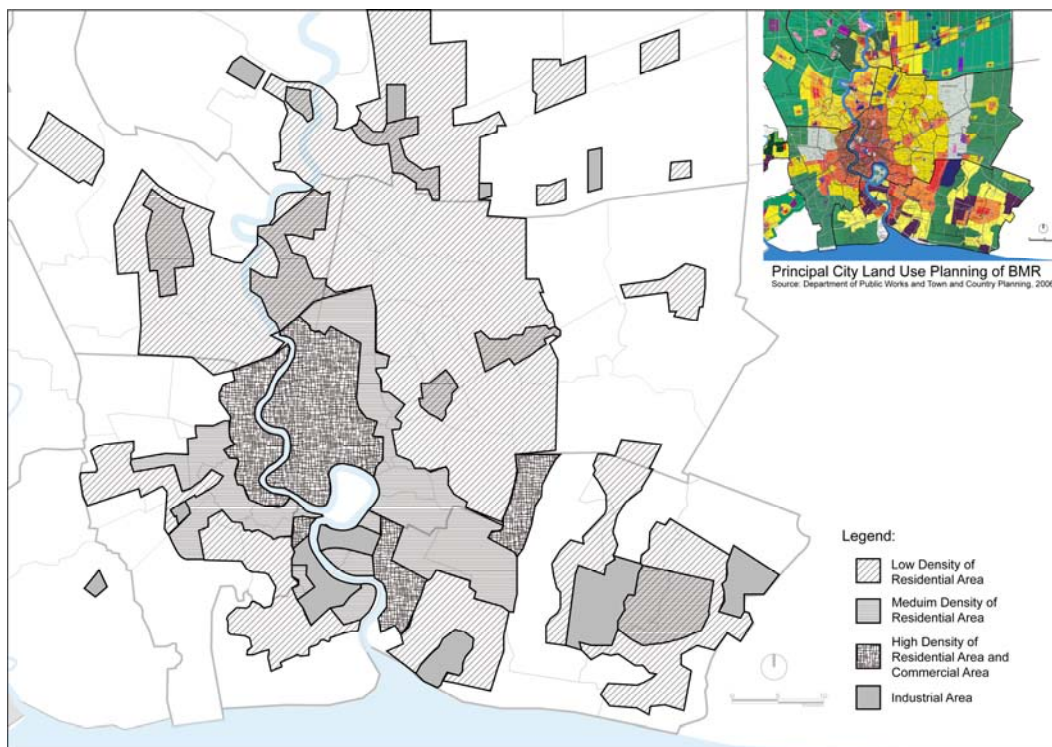
There is a distinct possibility that the Bangkok City Plan will be put to use soon for the first time after several failed attempts in the past 30 years. Bangkok will be divided into 14 land-use zones clearly separating residential areas from industrial, agricultural, recreational areas, and so on. In particular, the agricultural areas on the outer fringes of Bangkok outside the Outer Ring Road will be preserved for their original purpose. Industrial factories will be gradually moved to the fringe, and only light and non-polluting industries will be promoted. Flood prevention and soil subsidence measures will be closely enforced. As failure of controlling the direction of land usage in suburban area of BMR, this casual land use development made the unsatisfactory consequences on the existing communities. This led to poor development shaping seamless development of the large residential land use, especially in the north, east, and northwest of BMR, consequently,

causing misuse of land in suburban area as seen in Figure I-4.



**Figure I-4: Comprehensive Land Use plan of BMR**

(Source: Department of Public Works and Town and County Planning, 2006)

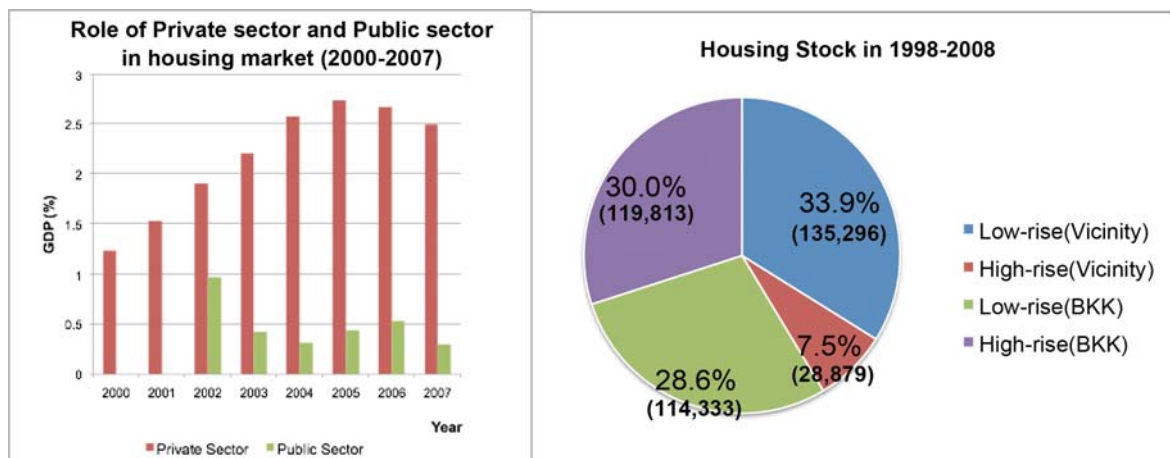


**Figure I-5: Low density of residential area in BMR**

(Source: Author, 2011)

According to effect of sprawl development, residential area increased 60,000 units per year and spread out to large area in outer skirt of Bangkok (Figure I-5). Moreover, the development plan of Bangkok Metropolitan Region also determined target areas for effectively town planning measures and plans with a total area of 7,639 square kilometers (National economic and social development board office, 1987).

According to table I-2, the relationship of social - economic situation and housing development situation, growth of housing projects relied on financial support and marketing from government support and private financial institution. Thus, the housing productivity fluctuated along 1967 – 2005. Government sector pioneered in housing development market in 1967, before private developers constructed the first development project in urban fringe and diffused to northern suburban area within 2 years later. In terms of typical housing type of BMR in this research, they can be classified in 2 main types; low-rise housing is one residential building consist of one owner/household including detached houses, townhouses, and semi-detached houses. Next, high-rise housing is referred to one residential building consist of many owners/households including apartment (one building – one owner but contribute rooms for rent) and condominium (one building – many owners but contribute rooms for sell). Each type has different numbers of unit and location as figure I-5.



**Figure I-6: Housing market in BMR**

(Source: Author, 2011)

Although, private developers are not innovator in housing development in early period of time, but they became the main role in housing market as bar chart in figure 10. There is considerably different Proposition of residential construction investment per Thailand's GDP (%) of Housing Market in 2000 - 2007. When focusing on the housing products that they developed, it can be found that the major housing type is the single-unit housing (low-rise housing) such as detached houses, townhouses, and semi-detached houses. Therefore, Single-unit housing by private developers are



interesting residential type that should be researched and focused.

The problems from sprawl development of BMR above, housing development projects are a primary cause of the problems. Because they are driven by market force of private developers, they are rapidly and largely developed among market competitors. Those housing projects, which are designed by carelessness, result in problems of living for residents who live inside and outside the projects and also to public goods in urban scale. As a report from Real Estate Information Center in 2008, there are 33.9% low-rise housing (include detached houses, townhouses, and semi-detached houses) and 7.5% high-rise housing in vicinity area, whilst in Bangkok city has only 28.6% low-rise and 30.0% high-rise. This can imply that low-rise housing development is the main residential type in vicinity area (Figure I-6).

**Table I-2: Housing Estate Development**

(Source: author, 2006)

	Year	Social and Economic Situation	Housing Situation	Housing Regulation
Beginning	1967	Government sector realized inadequate situation of housing in Bangkok because of rapid population growth.	The beginning of Housing Estate, the first project was constructed by government sector in the North and North-east of Bangkok.	No regulation
	1969	Private sector supported and cooperated with government sector to provide housing for people.	There were over 40 housing projects occurred with financial support.	No regulation
	1972	Government launched regulation of land allocation for customer protection.	Developers reduced production of house	Regulation for customers' rights but too strict >> difficult for developers to follow
1 <sup>st</sup> Flat Economic	1973 - 1975	1st Flat Economic because of Fuel price crisis and uncertain political situation in Thailand	Developers reduced production of house	Use previous regulation
Golden period of detached houses and townhouses	1976	Business tendency was better that led to an increase of real estate development.	Private developers were assured in housing market	
	1977	There was certain housing policy by government sector, rate of interest was lowered, and government housing bank support finance for private sector and the housing market competitors were increased.	Competitive situation in housing market; Developers provided better housing quality and management; Providing low-income houses	Housing policy: increasing residences up to 120,000 units within 5 years by public sector
	1979	Government housing bank supported financial loan for customers	1. Growth of housing estate increased 35%; housing projects expanded to northern of Bangkok 2. Townhouse development has emerged	

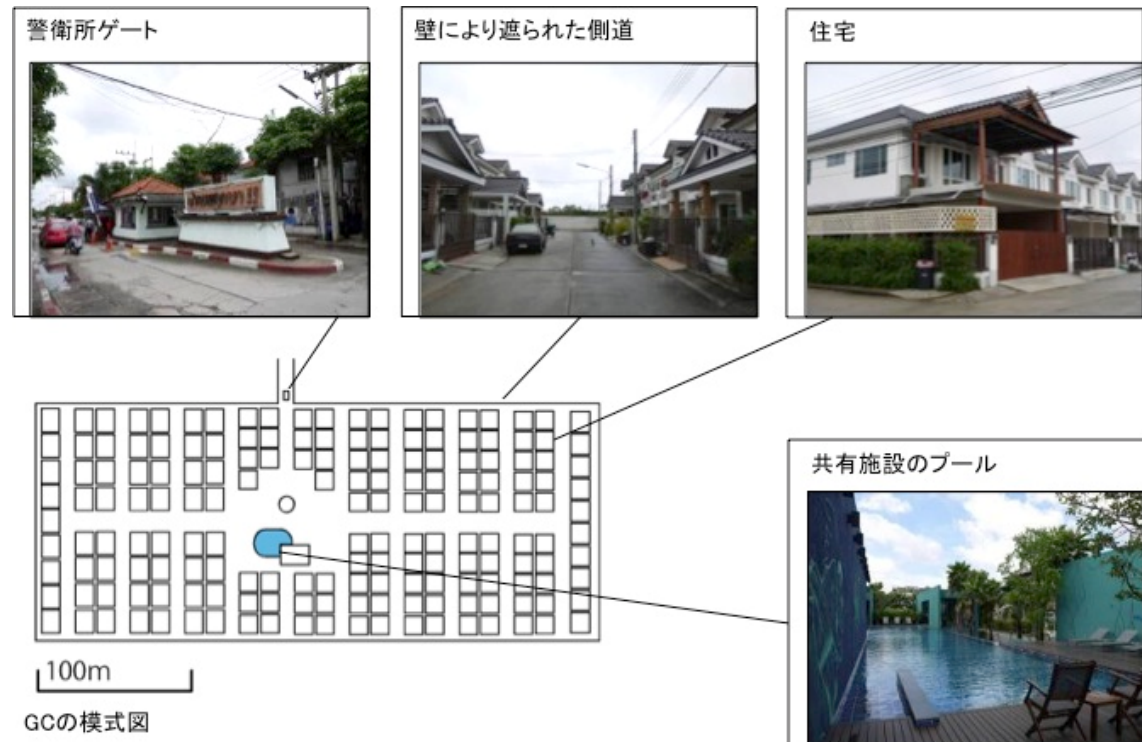
**Table I-2: Housing Estate Development (continue)**

(Source: author, 2006)

	Year	Social and Economic Situation	Housing Situation	Housing Regulation
2 <sup>nd</sup> Flat Economic	1980	2nd Flat Economic because of construction material price and wage was getting higher, and international interest was getting higher as well.	Main housing developers divided phases of construction into small projects; made a model of house before sell	More consideration on land allocation regulation
	1981			
1 <sup>st</sup> Recovery	1982	Recovered economic period because of liquidity of financial institution. Decreasing of interest, lower fuel price and electrical cost.	Architectural style of townhouse was changed from unspecific style to luxury, and western style such as classical architecture.	
	1986			
6 <sup>th</sup> – 7 <sup>th</sup> National Economic and Social Plan	1987	After economic recovery, purchasing power of homebuyers got stronger.	Housing units were adequate for demand of population.	Made Environmental Impact assessment (EIA)
	1992	The seventh National Economic and Social Development Plan was launched		
	1994	Although, overall economic was improved, there were 9 million people who were not able to buy their own houses.	Tendency of housing demand focused on location, quality, and infrastructure for living. This led to higher competition in housing market. Designers concentrated with layout design and modern style.	
Bubble crisis	1997	Terrible economic crisis; bubble economy	The entrepreneurs lost their margin. Buyers had low purchasing power and slower decision making.	
2 <sup>nd</sup> Recovery	2001	Economic was improved	This was the highest competition in market that brought various alternatives of housing type for consumers.	Updated Land, Allocation act
	2002			
	2004	Real Estate market was over supplied	The growth of housing development was obstructed.	
	2005	Housing stock slightly decreased. Cost of construction material was increased.	Tendency of low rise housing was peaked again because of higher interest but housing price still was more expensive.	

#### 1.3.4. Situation of Gated Housing Development in Bangkok Metropolitan Region

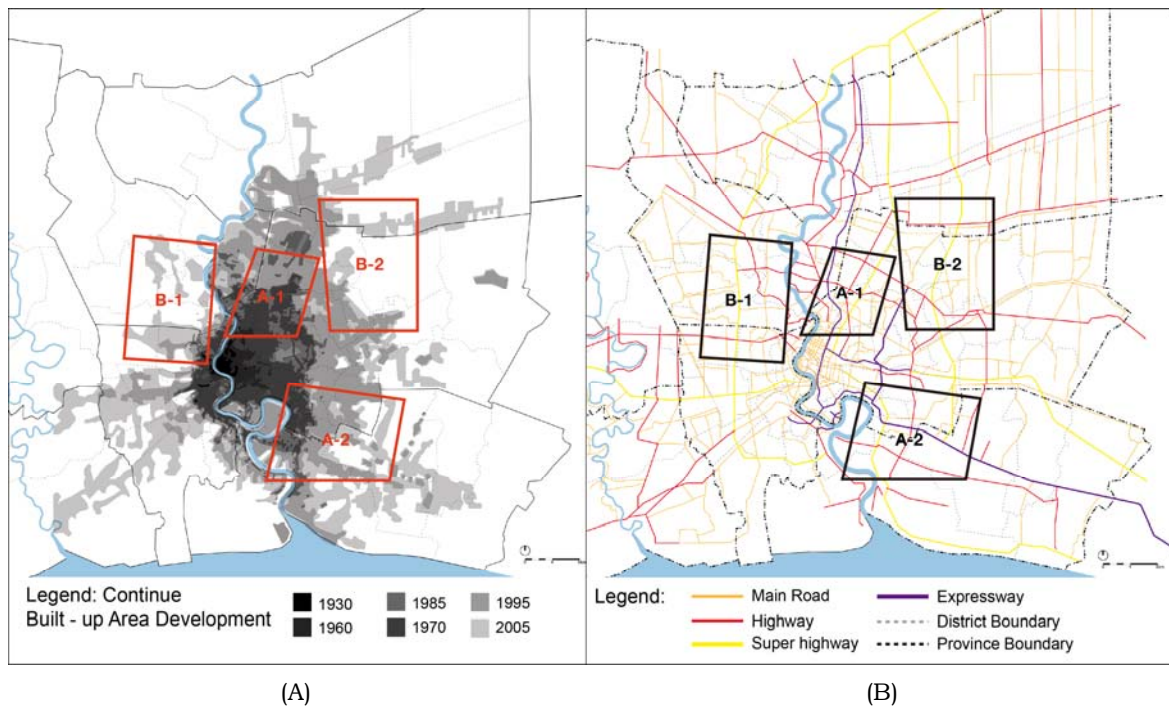
According to previous work of author (Tanaka, Klinmalai, and Kanki, 2012), the study analyzed the location of gated communities in suburban sprawl in Bangkok. The aim of study is to understand gated communities development across Bangkok metropolitan region through Map magic and GIS program.



**Figure I-7: Typical elements of gated housing projects in BMR**

(Source: Tanaka, Siwaporn, and Kanki, 2012)

The existing environment inside GHP included: gate connects to public road; walls of community blocked personal road; housing units (detached house or townhouse); and common amenities (Figure I-7). The result found around 80% is gated housing projects, which located in B-1 and B-2 (Figure I-8). They are newly developed area since 1995. The road networks in those areas contain super highways and main roads. This finding confirms the prospected area that becomes problematic area.



(A) Built-up area development 1930-2005

(B) Road network in BMR

(Source: Adapted from Tanaka, Siwaporn, and Kanki, 2012)

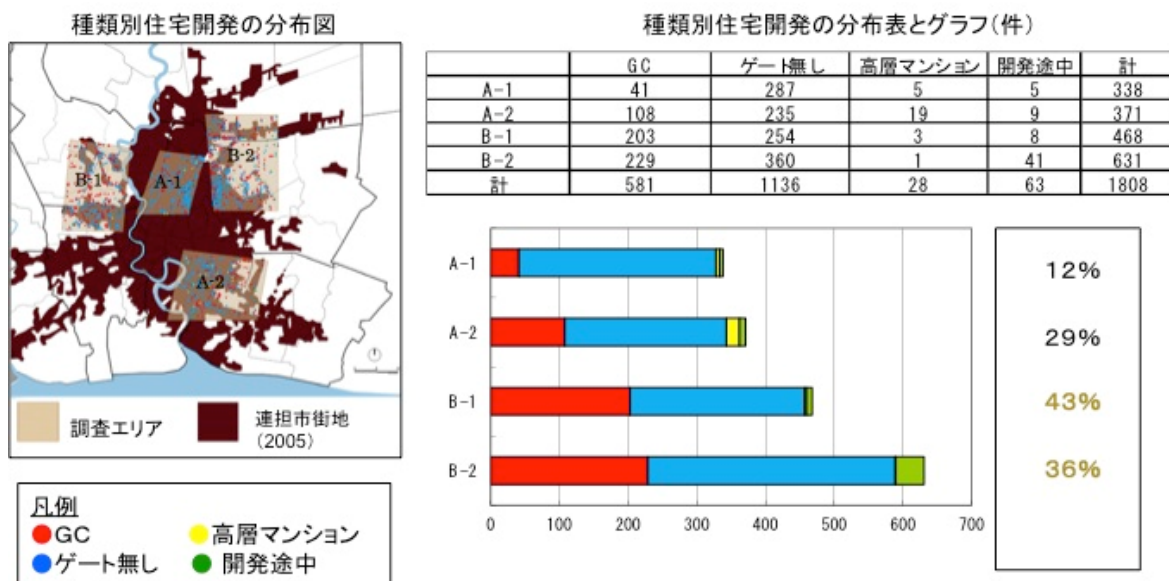


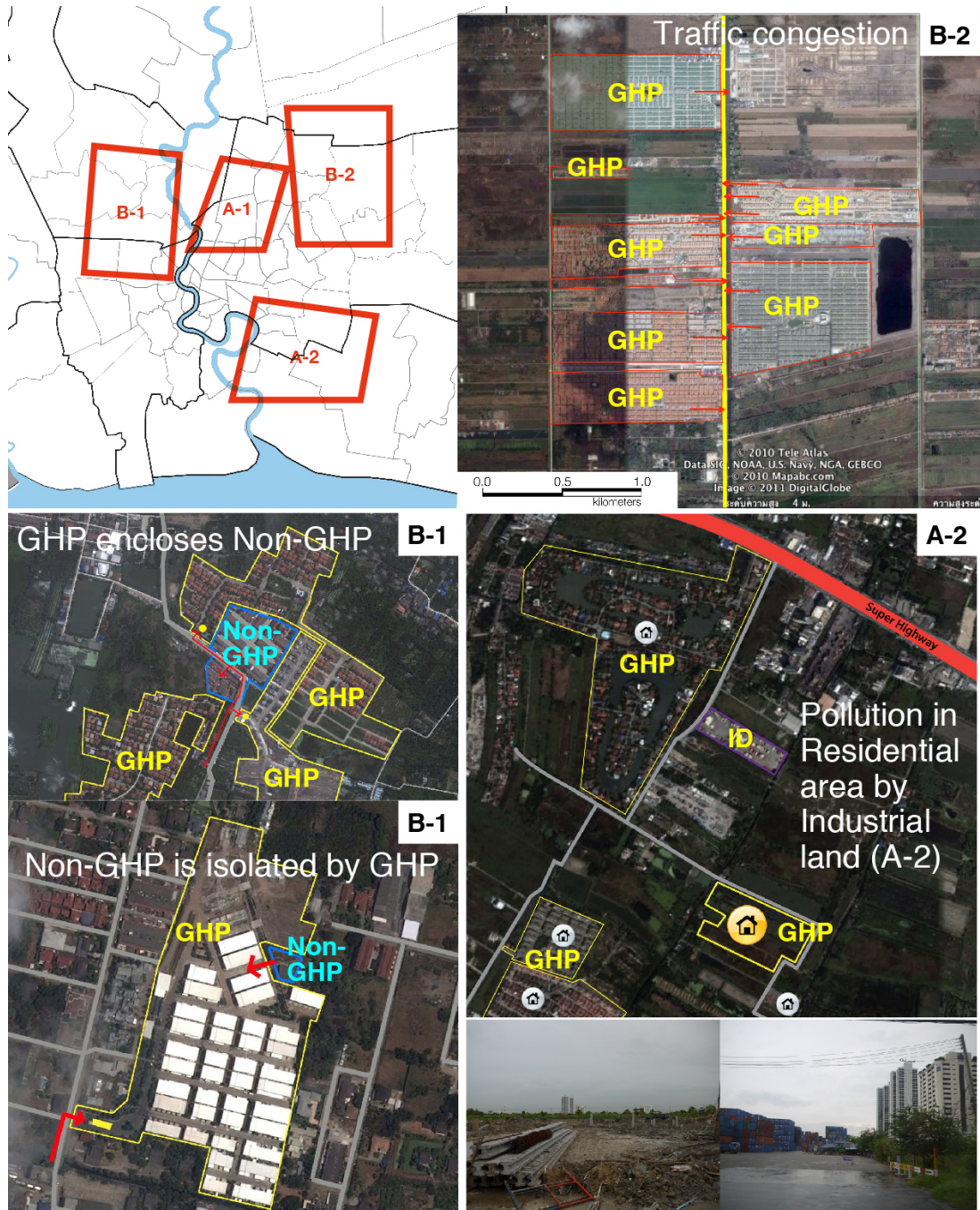
Figure I-8: Location Analysis of GHP in BMR

(Source: Tanaka, Siwaporn, and Kanki, 2012)

During overall physical observation, we found high density of gated housing projects as revealed above has problems about traffic congestion in local road and main road. When respect the map of high-density area, there is unbalance between road network and number of GHP. Because surrounding GHPs development are agricultural



lands and former villages, it is possible to disturb agricultural activities through unintended releasing pollution. The location of GHP in remote area, which road network is not developed effectively, it makes isolation of former communities to connect the main road (Figure I-9).



**Figure I-9: Situation of GHP in B-2 area of BMR**

(Source: author, 2012)

### 1.3.5. Study of Social Interaction

As typical characteristic of GHP is mentioned above, the effect of GHP on social problems are paid attention from many scholars in various aspects. For instant, Blakely (1997) found that gated communities reflected to various degrees of four social values (sense of community, exclusion, privatization, and stability) in positive social value for inside residents. His results supported that the sense of community could be enhanced by physical neighborhood design. Buckner's (1988) finding also agreed that a well-defined boundary contributes to the connection to a particular place and the sense of community therein. The ultimate boundary of gated communities is often promoted as to increase the sense of community. Meanwhile, Le Goix (2003) mentioned about the discrepancy between a gated community and its vicinity defined as a 'discontinuity', in order to focus on whether a higher degree of social differentiation. He found that gated communities are territories that differentiate from their vicinities especially on age criteria and socio-economic status.

On the other hand, the Gated Communities (GCs) researches in Asian cities, Sakip et al. (2012) compared the sense of community between gated and non-gated community. They found that residents in non-gated residential areas have a higher sense of community as compared to those in gated communities. These notions affirmed that GHP development influenced on social interaction in community and urban scale, and depended on context. According to those researches, studying effect of GHP should not be limited to only inside community, but relationship of residents between different communities should also be analyzed at the same time. In order to investigate social interaction in Asian context, we could not totally duplicate the western method to BMR situation. It is necessary to apply some core value of social assessment for our research. The social impact assessment (SIA) embodies the evaluation of all impacts on humans and on all the ways in which people and communities interact with their socio-cultural, economic and biophysical surrounding (Vanclay, 2012). However, one of the core values of SIA are described about a way of conceptualizing social effects in terms of the quality of social relationship considering about people's way of life – that is, how they live, work, play, and interact with one another on a day-to-day basis. In general social interaction literature, investigators have looked at frequency of encounters between respondents and members of their social network, and counted the number of persons in the social network (Conner, et al, 1979). This means the measurement covered both inside and outside of their communities or neighborhood. Moreover, their findings are interrelated with measurement of neighborhood interaction that is a part of the sense of community evaluation, and important for urban planners. This conceptual idea about social interaction assessment is appropriate to apply for the sense of community evaluation in BMR.

#### 1.4. Originality and Contribution of the Study

As previous sections reflect the initial idea of research, it shows significance of gated housing projects in BMR as the main driver of phenomena. That also shows trend of GHP growth in suburban residential area of BMR. The effects from this phenomenon may influence on existing inhabitants and newcomer in residential district as shown in section 1.2. The important perspective of effect evaluation in this research is social relationship of residents because the isolation of community in BMR context seems to increase according to the growth of modern housing development such as gated housing project.

As Table I-3 shows comparison of previous researches, most of previous works were in western context that concentrated only inside GHP and only outside GHP. Because they focused whether within GHP or outside GHP, the results might not clarify full effects from this kind of development. Particularly in BMR context, the effects of GHP should be simultaneously considered inside GHP and surrounding communities (Figure I-10).

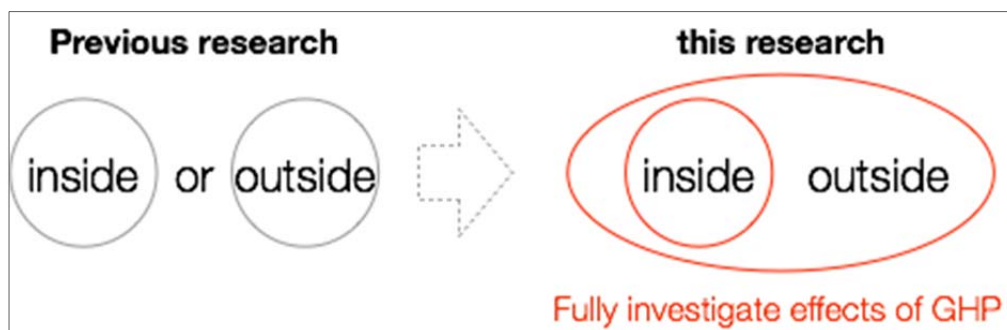


Figure I-10: The positioning of this study

General researches about residential development in Bangkok usually involve with low-income housing, slum, national housing by public sectors, or architectural design. Although those styles of residential are occupied by majority of population in the country, the biggest housing market share is gated housing project development (GHPs) that has much effect on living condition of residents as confirmed above. The researches about GHPs become less concentration and are mostly invested for marketing researches in private residential developers. They have less consideration about quality of living or neighborhood relationship of surrounding people. The international discussions of gated communities' also concerned quality of living inside. General social relationship studies tried to compare gated and non-gated development but it is not in the same area (Sakip, Johari, and Salleh, 2012). That could affirm the environment of community influencing on relationship, but could not reflect the effect of allocation of GHPs.



The study attempts to evaluate the effect of gated housing development in terms of neighborhood relationship assessment in classification of sprawl area in Bangkok Metropolitan Region, especially focusing on inside relationship of residents in different types of community and outside relationship on surrounding communities. The following table (Table I-3) reported some highlighted and related previous works on residential in BMR and social relationship of gated communities.

Contribution of the Study is as follow;

1. Reduce effect from careless housing project development in sprawl area of BMR
  - Appropriate traffic capacity of local roads and main roads brings about Traffic Congestion reduction
2. Prospected benefits for Residents and Developers
  - Residents: Better Quality of living and Self-maintenance of common space
  - Local Residents: Collaboration of new-old community for town improvement
  - Developers: More concern about public
3. Prospected guideline solutions
  - Guideline or Standard or Compatible index for housing projects development in BMR
  - Related Housing Regulation Improvement

**Table I-3: Previous works on Gated Housing Development**

No	Research topic and Researchers	Site	Within GHP	GHP and surrounding communities	GHP on regional consideration
1	Sense of Community in Gated and Non-Gated Residential Neighborhoods (Siti Rasidah Md Sakip, Norain Johari, and Mohd Najib Mohd Salleh, 2012) (Article)	Malaysia	1) Non-gated residential areas demonstrated higher sense of community 2) Social interaction among residents will be enhancing in an environmental design and building physical designs that motivate them to go out for reaction	-	
2	Section: Behind the gates: Integrating the social and psychological (Setha Low, 2003) (Book)	United States		-	1) How political and economic perspectives illuminate the psychological, 2) How personal experience sheds light on the social
3	Gated communities: Sprawl and social segregation in southern California (Renaud Le Giox, 2004) (Article)	United States		-	1) The sprawl of GCs increased segregation, 2) Socio-economic dissimilarities associated with the enclosure, 3) Homogeneous territories, especially on income and age, also influenced on social segregation
4	Gated communities as club goods: segregation or social cohesion (Tony Manzi, Bill Smith Bowers, 2005) (Article)	England	Gating can help to foster social cohesion by involving a wide spectrum of communities and income groups to: reduce crime, increase safety and enhance the local environment by preventing unsolicited entry	-	

**Table I-3: Previous works on Gated Housing Development (Continuous)**

No	Research topic and Researchers	Site	Within GHP	GHP and surrounding communities	GHP on regional consideration
5	Differences of the use of public open space of residents in Gated Communities and Non-Gated Communities in Nonthaburi Province (Malikaphiphat 2010) (Thesis)	Thailand	Types of communities are significantly correlated with the use of public open space in terms of 1) length of time to stay in public space, 2) frequency of visit, 3) types of activities, 4) types of public space, and 5) accessibility	-	
6	The Role of Housing Development Projects on Urban Expansion (Kessupa 1985) (Thesis)	Thailand		-	Housing Development Projects cause many problems such as traffic congestion in suburban, waste budget for public infrastructure, land use confusion, encroachment on agricultural area, environmental problem, and gap of housing regulation
7	Residents and Housing Managers' opinions of property management for medium class "Private Sector Housing" in the Bangkok Metropolitan (Wisnuwatnakit, 1994)	Thailand	1) They found problems of property management such as cleanness, common facility maintenance, and safety 2) Overall, residents were unsatisfied on current property management and needed inspection for committee of housing development	-	

## 1.5. Objectives and Research Framework

As previously mentioned, private sectors are the main players in housing market and rapidly develop housing projects in suburban residential area. Otherwise, public sectors provide urban infrastructure according by the town planning and regulation to control housing development. There is unbalance between concise plan and rapid growth of housing projects development. This leads to haphazard development in suburban area which effects on existing communities particularly on social relationship. These problems can cause incoherence in district scale that make troubles on urban planning.

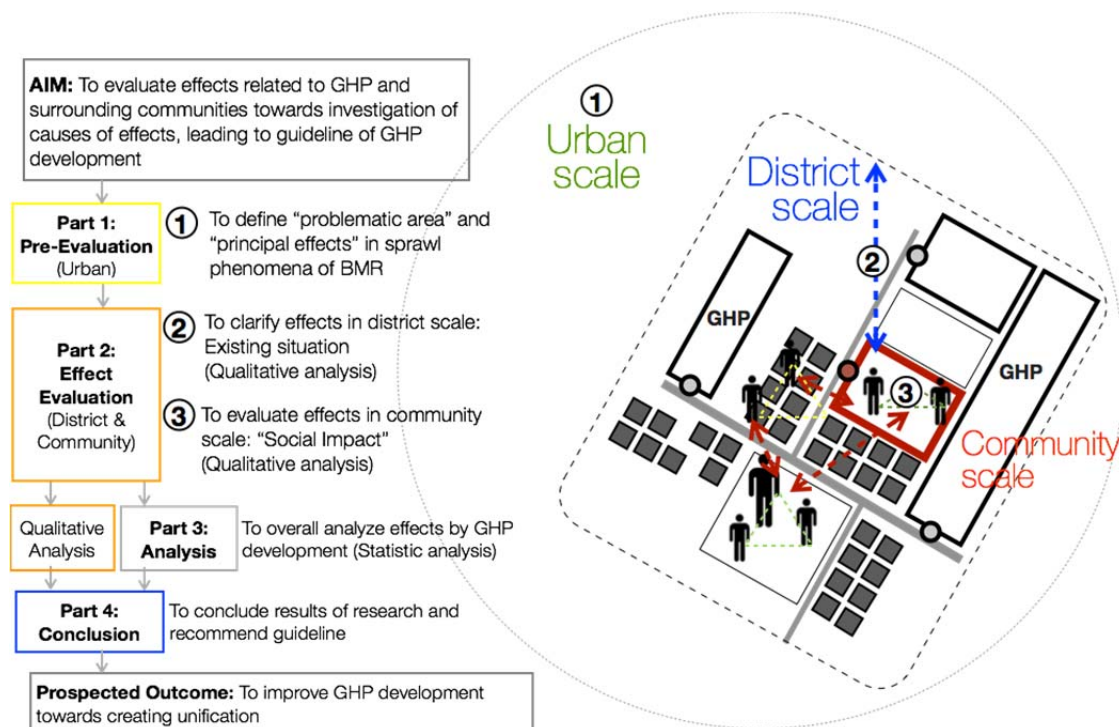


Figure I-11: Research Framework

This research aims to evaluate effects related to GHP on surrounding communities towards investigation of causes, leading to guideline to improve future GHP development. The prospected goal of research is to create unification among residents in mixed types of residential areas through reduction of social impact of GHP development in suburban residential area.

To achieve the goal of study, the research objectives and workflow can be described in diagram in Figure I-11;

- 1) PART I – To define problematic areas and principal effects related to gated housing projects development in sprawl phenomena (urban scale) of Bangkok

- Metropolitan Region (Chapter II, III). This part is as pre-evaluation of the research.
- 1.1) To clarify primary effects
  - 1.2) To specify problematic areas of those effects and characteristics of area
  - 2) PART II - To evaluate social relationship of inside and outside residents of gated housing project through multiple sources of evidence (Chapter IV, V, VI)
    - 2.1) Existing situation of gated housing projects in district scale
    - 2.2) Impact on social relationship of residents inside and outside gated housing projects in community scale
  - 3) PART III – To analyze causes of effects by gated housing projects development towards basis guideline for future GHP development (Chapter VII)
    - 3.1) Comparative analysis to compare results from case studies
    - 3.2) Tendency analysis to investigate factors related to effects, particularly social relationship
  - 4) PART IV – To summarize effects by gated housing projects development towards basis guideline for future GHP development (Chapter VIII)
    - 4.1) Conclusion of results in all chapters
    - 4.2) Recommendation of basis guideline to reduce the effects and improve gated housing project development in critical areas and general area

## 1.6. Research Methodology

This investigation begins from macro scale to micro scale approach (Figure I-12). First part, literature review and overview observation is applied to understand situation in Bangkok Metropolitan Region and examine primary problems (Chapter II). Then sprawl area is classified through the specific index of sprawl classification. This results in evaluation of different 4 types of sprawling level and its impacts, which will lead to identification of problematic area (Chapter III). This result proposes; a key driver of sprawl development in BMR, different and mutual characteristic, and primary problems.

Second part, the representative of critical sprawl area is selected as the most problematic areas. After selection of case study area, the important issue for effect evaluation based on discovered problems in the first phase, namely social relationship impact. Because a good evaluation needs multiple sources of evidences to create multiple perspectives in analysis, the study designs multiple method of evaluation (Chapter IV). The physical environment observation is created to recognize existing situation of study area as evidence-based analysis. The questionnaire is used for the main evaluation of social relationship and its results are calculated via statistic methodology. The interview is also asked to external stakeholders (developers and local governmental officers) as supportive results. These methods are used to evaluate effects of GHP in selected case study areas (Chapter V, VI). The questionnaire results are

calculated via SPSS program and integrated results from physical observation to prepare for analysis stage in next part of research.

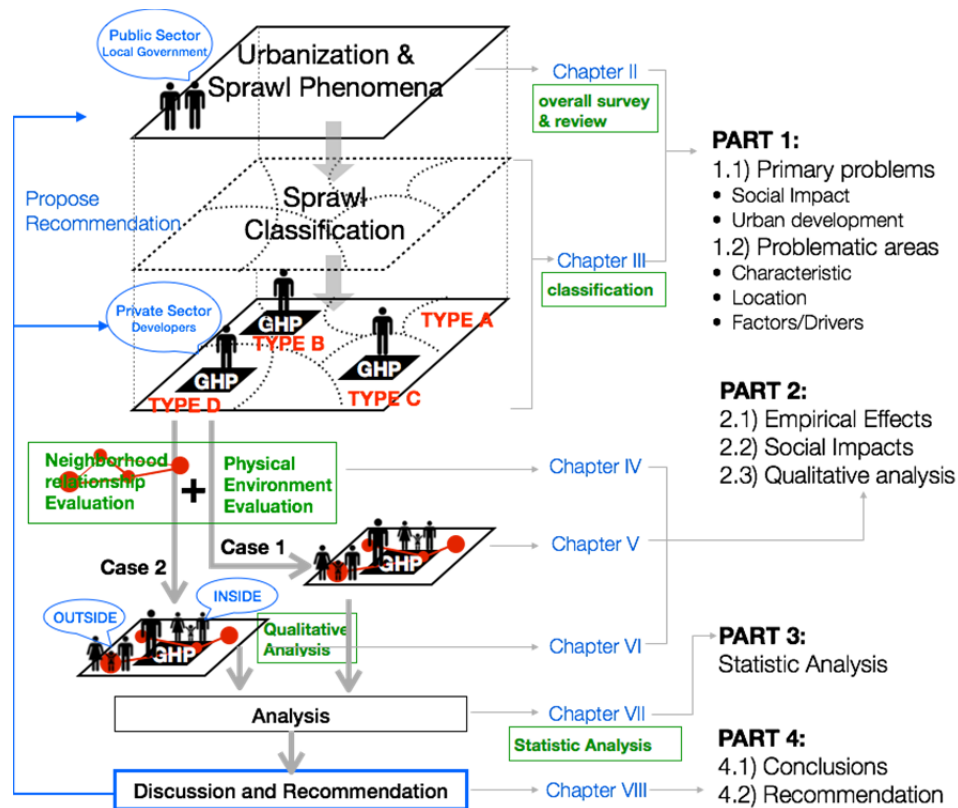


Figure I-12: The research flow

Third part, after results from questionnaire is formed in statistic value, the tendency analysis includes ANOVA and T-Test is used to clarify relevant factors influenced on social relationship. In addition, the comparative analysis is also applied to correlate different and mutual outcomes and social relationship among case studies (Chapter VII). From this phase, we can recognize which characteristics of case study highly promote inside and outside neighborhood relationship.

Final part of research will conclude all results from all chapters into Chapter VIII. The findings of relevant factors and all evidences are synthesized to propose recommendations to for GHP development in future. These suggestions are important for developers and local government to reduce effects of GHP in specific area and general area.

## 1.7. Structure of Dissertation

To achieve goal of study, major four parts conduct the research as follow; pre-evaluation of investigation of sprawl phenomena in BMR, evaluation of effects of GHP, results analysis and discussion, and conclusion and recommendation for future GHP (Figure I-13). At the first part, the principle effects of GHP development in sprawl phenomena of BMR are prepared to define the main problems are urban development and social relationship of inhabitants. This sprawl area is measured by factors combined literature review and condition of sprawl in BMR. The index of sprawl measurement is used as a key of evaluation method to classify sprawl area into four stages of sprawl development. The findings of this part are problematic areas and characteristic of GHP allocation in each category. They become the pre-evaluation stage before making the effect evaluation in next part of research. The case studies are selected regarding the most severe areas, and are evaluated the effects concerning the revealed principle problems. These contents are described from Chapter I to III.

After comprehension of GHP situation in urban scale was exposed in the Part I, the next part of dissertation described about effect evaluation of GHP development in case study areas. The representative sprawl areas are chosen in Pathumthani and Nonthaburi province where has high accumulation of GHP. Both areas are expected that have high impact on social relationship because of disorder and congestion of GHP in residential area.

Chapter IV will clarify specific indices of neighborhood relationship evaluation of GHPs and method to consider current situation in sprawl case study. The tools and methods of questionnaires survey and physical observation will be designed. Chapter V and VI are conducted with the same structure as follow; background of area, characteristics of current land composition, neighborhood relationship assessment, and data analysis. According to physical observation on existing situation, there are diverse communities including; former village (FV), gated housing project with detached houses (GHP-D), gated housing project with townhouse (GHP-T), housing project with no-gate (HP), and individual house (IH) in both cases. In addition, we found the differences of GHPs' location in residential land composition are congestion of GHPs in Pathumthani and dispersion of GHPs in Nonthaburi. This condition leads to problems on quality of living on surrounding communities such as traffic congestion in dense GHP development area and encroachment on agricultural lands in disordered GHP development area. This situation emphasizes possible effects on social relationship of inhabitants. The social relationship for inside and outside residents is assessed directly through 400 questionnaires in each study area. Moreover, the supply-side of GHP development (developers and local governmental officers) is also important to be inquired via structural interviews. The results from questionnaires distribution are analyzed in qualitative way to clarify respondents' perception and opinion at the

end of Chapter V and VI. The quantitative analysis from questionnaires will be calculated in next Part to understand overall neighborhood relationship in district scale of both case study areas.

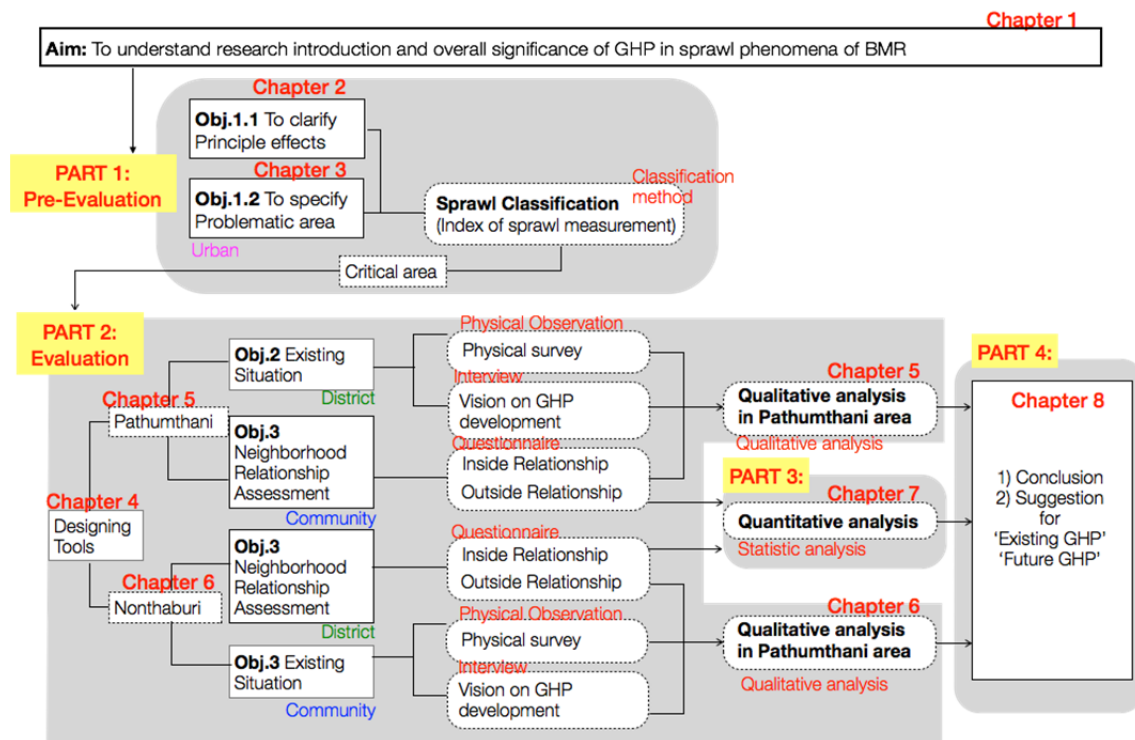


Figure I-13: Structure of dissertation

Part III includes statistic analysis of results from questionnaires in Chapter VII in order to investigate; the relevant factors related neighborhood relationship, and explanation of causes of that relationship. The discussions will be supported by the supportive results from interviews and field survey. When compared inside and outside neighborhood relationship between congested GHP area and disordered GHP area, the common results are similarity of IR and OR of GHP-D and HP in both cases. The relevant factors that influenced on neighborhood relationship are analyzed through ANOVA and T-Test analysis. The analysis can affirm that physical environment of community and characteristic of residents significantly influence on social relationship. The common influenced factors can be applied for GHP in general area. The different influenced factors can apply for GHP in specific case studies. These significant related factors can create points of recommendation that will be suggested in the next chapter.

Conclusion and recommendation are exposed in Part IV within Chapter VIII. In summary, gated housing project development is a key driver of sprawl phenomena in Bangkok metropolitan region. The principle effects from GHP development in residential scale are; community isolation, land use confusion and encroachment, and traffic congestion. As the pre-evaluation of effects in urban scale, there are four stages of sprawl area. The most critical area consists of accumulative GHP diffusion with



inefficient infrastructure and weak land use planning. In district scale of case study areas, the current situation is clarified the effect evaluation of GHP on residents inside and outside GHP. The different physical condition of GHP in case study areas is shown the unique characteristic. The social relationship is summarized and compared among different case study areas. This can reflect reconsideration on GHP development comparing with non-GHP. For the influenced factors that are found in previous part, can generate basis recommendations for future GHP development. In real situation, we cannot immediately stop GHPs' growth and cannot eliminate entire walls of GHPs. As the recommendation, this is expected to improve gated housing projects towards create the unification in residential area in the future.

## 1.8. Terms of Definition

### 1. *Bangkok Metropolitan Region (BMR):*

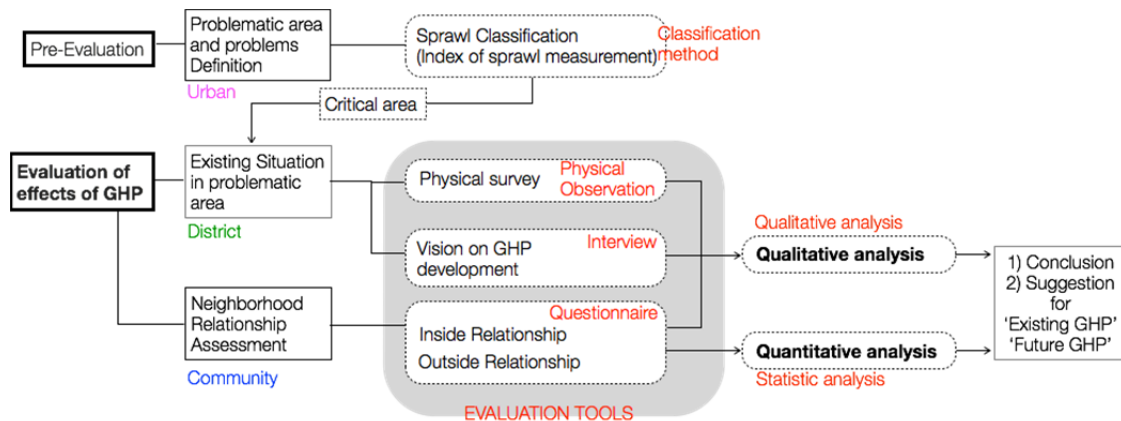
Bangkok Metropolitan Region includes 6 administrative provinces (Bangkok, Pathumthani, Nonthaburi, Nakhonpathom, Samuthsakhon, and Samuthprakarn). There is Total Area is 7,761.6 km<sup>2</sup> (Figure I-2). However, in this research cover area according to distance of Bangkok Rapid Transit System (BTS) development plan from 2000 – 2029 because they are current area where already developed under the national plan and connected Bangkok City. Thus net area of BMR in this research consists of; 69 administrative districts in Bangkok and 5 vicinity towns are total 4,607.202 km<sup>2</sup>.

### 2. *Effect Evaluation:*

Effect evaluation is adapted partial concept of Impact evaluation in social welfare. The effects are defined as: the positive and negative, intended and unintended, direct and indirect, primary and secondary impacts produced by an intervention. An impact evaluation includes any evaluation that systematically and empirically investigates the impacts produced by an intervention. Moreover, it measures the change in a development outcome and is based on models of cause and effect (Ptricia, 2012).

The best quality of evaluation uses multiple sources of evidence (which have complementary strengths) and multiple perspectives in analysis and interpretation. However, general 'impact evaluation' asks not specific questions and focuses on a small number of questions and not specific questions. Thus terminology of 'effect evaluation' in this study is slightly different from 'impact evaluation' concept. The 'effect evaluation' of this research (Figure I-14) also requires pre-evaluation stage to prepare substantial points for social effect evaluation in the main part of research. The real stage of evaluation of GHP

includes multiple sources of evidences: physical observation to explain cause of observed impacts; questionnaires with many specific questions to evaluate respondents' relationship (based on social relationship assessment theory). For multiple perspectives in analysis and interpretation, interviews of external evaluation experts are included before making conclusion.



**Figure I-14: Terminology of Effect Evaluation in this research**

### 3. *Urban Sprawl:*

Urban Sprawl is one name for many conditions. It has been attached to patterns of residential and nonresidential land use, the process of extending the reach of urbanized areas (UAs), the causes of particular practices of land use, and the consequences of those practices. Sprawl has been denounced on aesthetic, efficiency, equity, and environmental grounds and defended on grounds of choice, equality, and economy (George, et al. 2000).

### 4. *Gated Housing Project Development (GHP):*

The physical design of GHP in BMR has slightly different from in US, although they expect to create a dreamed community as similar as US. The typical compositions of GHP in BMR are 1) Houses, 2) A gate with security guards, 3) Concrete fences enclosing project site, 4) Common facilities such as park, playground, club house, and 5) Basic infrastructure such as water supply, common road, and wastewater treatment (Figure I-15). Only the gate with security guard and the concrete fence of project site are not determined by housing regulation in government gazette (Department of Lands, 2007). The aim of this governmental regulation is to set the standard of living for residents inside the GHP.



**Figure I-15: Gated Housing Project Development**

This is resembled with general gated community definition in American researches. Gated Community is part of the trend toward exercising physical and social means of territorial control with gates, private security guards, and barricades help control one's environment and improve quality of life (Blakely & Snyder, 1938).

5. *Community:*

When an identified community is a little village, its boundaries appear at first to be very simple. That pattern of human interaction may be seen as consisting only of relations between the residents living inside that location, inside that village. However, its residents interact also with people outside the village, the boundary of community is not so precise. Especially in urban community, its boundary became wider and more heterogeneity than rural community (Bartle, 2013). In case of study area, it may be seen as mixed type of community because area has been developed from agricultural to urban society. Hence, "community" in this paper means a group of people living together in residential area that might has or not has geographic boundary in planned or unplanned way. We found five types of community in Nonthaburi area, namely, community with geographic boundary, which developed by developers, is 1) gated housing project consisting detached houses (GHP-D), 2) gated housing project consisting townhouse (GHP-T), and 3) housing project without gate (HP). Moreover, we viewed community without geographic boundary and originated in unplanned way included 4) former villages (FV), and 5) individual houses (IH).

6. *Social interaction assessment (SIA):*

Due to disorder diffusion of GHP in BMR is rapid phenomena without well-urban planning. This situation influences on social interaction not only residents who live inside GHP but outside (Klinmalai and Kanki, 2013). That paper mentioned the impact of GHP on neighborhood relationship in Pathumthani area. That means GHP development related with social interaction. Therefore, the SIA in this study includes three dimensions of assessment; structural questionnaire of neighborhood relationship, non-structural physical observation, and structural interview with relevant stakeholder.

7. *Neighborhood relationship:*

The definition of neighborhood relationship in this study is an interaction from individual person to neighbor and surrounding community. Therefore, neighborhood relationship in this study (Figure I-16) focuses on social interaction between residents inside community as “inside relationship assessment” (based on sense of community’s concept), and between inside resident and outside community or village as “outside relationship assessment” (based on neighborhood comprehensive concept). The inside relationship assessment’s questions strived to examine sense of community inside community, while the outside relationship assessment’s questions tried to evaluate behavior of residents outside community.

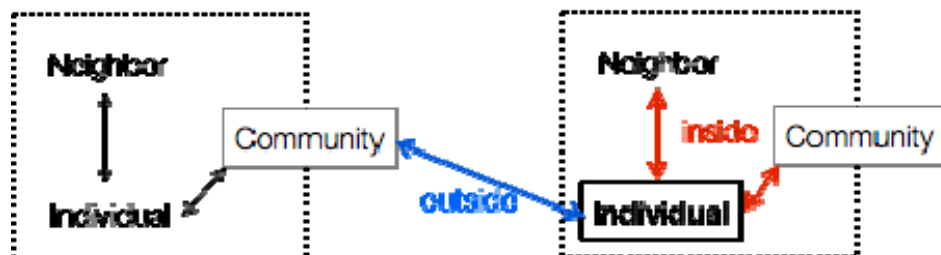


Figure I-16: Neighborhood relationship assessment in this research



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# PART 1

## **Pre - Evaluation for identification of primary effects and problematic areas in urban scale**

Part 1 aims to define problematic areas and principal effects related to gated housing projects development in sprawl phenomena (urban scale) of Bangkok Metropolitan Region as pre-evaluation.

This part consists of two chapters as follows:

**Chapter II** will study on existing situation in Bangkok Metropolitan Region (BMR) that is influenced from sprawl phenomena. This chapter reveals specific characteristic of sprawl development in BMR.

**Chapter III** will focus on further investigation on sprawl development through classification and comprehension of GHP diffusion. At the end of chapter will select the case study areas of research.





## CHAPTER II

### Gated Housing Project Development in Sprawl Phenomena of Bangkok Metropolitan Region

#### 2.1. Introduction

This chapter focuses on existing situation in Bangkok Metropolitan Region (BMR) that is influenced from sprawl phenomena, especially Gated Housing Project (GHP) situation as an important factor. The beginning of chapter discusses about clarification of causes and effects of sprawl phenomena in BMR through reviewing sprawl definition in another Western and Asian cities. Next section identified relevant main factors, supporting factors, and effects of sprawl through literature review. Then the field survey conducts the current situation and problems in BMR. From this point, GHP development becomes the significant discussion of this study. In order to identify the specific characteristic and impacts of GHP in BMR context, it is necessary to study GHP in international aspects and the raise of GHP in BMR in the forth section. This section discovered social relationship is a critical problem that consequences on overall regional development (will be discussed in Chapter IV). The end of chapter will discuss about findings of chapter and emphasize the connection among sprawl phenomena, GHP, and social relationship as foundation of knowledge in this research.

##### 2.1.1. Background

As mentioned in previous chapter, Bangkok Metropolitan Region has been in sprawl situation since has affected from global rapid urbanization. That has simultaneously influenced on socio-economic of citizen and urban development. The gap of income has been increased, and then leads to polarization among social classes and fear of crime. There is arguments range from supply-side claims that the financial benefits to developers, builders, and municipalities drive gating's success, to demand-side proposals that preferences of homebuyers are the principal motivating factor (McKenzie, 2002; Judd, 2002).

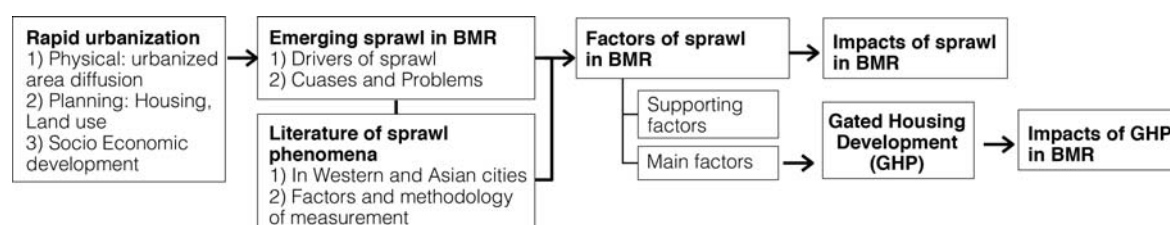
In term of urban development, infrastructure has been extremely developed to peripheral area of BMR, especially road network that is included in The National

Economic and Social Development Plan during 1987 to 1996. This national plan intended to improve and expand transportation in suburban area of BMR, in order to reduce overcrowded population in Bangkok city and connect to sub-economic center. Central government invested around 94% (1,410 million dollars) of budget of transportation plan to construct road network such as toll-ways, highways, and bridges<sup>2</sup>. Consequence, there is unbalance between road network and public transportation network, and then bring about increasing private automobiles usage. This kind of phenomena could be called as sprawl development occurred in BMR. Because developers also envision on this trend, they pay more attention on suburban housing developments without updated residential regulation. Later the act for residential development had established in 1972, there was no reconsideration of plans until 2000. Even though the housing development has obviously increased by motivating infrastructure plans since 1987. It seems to be a delay modification of residential regulation and causes the haphazard housing development in peripheral area of BMR.

According to the supply-side, demand-side, and fully provided infrastructure as mentioned above, developers certainly prolifically build the gated housing development in greater area of BMR. Furthermore the disorganized housing situation also has influenced on citizen life in that area. The possible effects from this situation originate the research goals, and emphasize why we have to concurrently investigate sprawl occurrence, gated housing development, and its impact of citizen. Hence it is important to thoughtfully examine the sprawl phenomena in BMR through gated housing development at the beginning of study.

## 2.1.2. Objectives

This chapter intends to clarify current sprawl situation in BMR that lead to recognition of principal factors and impacts. Afterward, gated housing development, as a primary relevant factor of sprawl, is deeply examined to identify particularity of gated housing project in BMR. This towards the remarkable subject of significant impacts from gated housing project at the end of chapter.



**Figure II-1: Structure of Chapter II**

(Source: author, 2012)

<sup>2</sup> National economic and Social Development Board office of the Prime Minister Bangkok : Key issues of the main programs, the sixth National Economic and Social Development (1987-1991), pp. 17, 1987

### 2.1.3. Research method and Analysis

Regarding conservation of sprawl phenomena and gated communities is international issue, there are many previous studies in Western and Asian context. Literature review is important for beginning of study, and then physical observation will be used to investigate overall current situation of BMR (Figure II-1). Finally, the impact of gated housing project will be revealed as findings of this chapter.

## 2.2. Emerging sprawl phenomena in BMR

Bangkok is as the capital city since 1782, located at the central region of Thailand. Its geography is low plain and consists of many canal networks, which is appropriate for agricultural cultivation particularly the rice fields in suburban of Bangkok. The original Bangkokian have been as small communities along the Chao Phraya River, the primary river of Thailand, and covered area just 4.4 km<sup>2</sup>. The waterways were used as major transportation. When the city has rapidly modernized since King Rama IV - V, the civilization has been applied to polity, culture, and also urban development. During this era, the western townscape influenced on urban development in Bangkok, especially road network. The former roads were used for carriages and carts; hence they were made from soil and mud. Beginning on usage of cars in late of King Rama V era (1880), quality of roads were improved and spread to perimeter of city. In term of urban development, this huge movement of civilization resulted in thread of modern transportation instead water network. Former people have changed their house's accessibilities from the canals to the roads; and the water transportation has depreciated. The city have been disorganized planning, the road network were constructed without cautious plan. Since 1960, an American urban planning company and Thai government created the first land use planning of Bangkok (Rujopakarn, 2000). The expansion of urban area is substantially uncontrolled because it was late to try to control because the city was established over 80 years ago before and there was already expanded unplanned area. Consequence, the urbanized area has been rapidly expanded as shown in Table II-1, the boundary of Bangkok has been larger responding the increasing of population.

Now Bangkok city plans are applied to cover Bangkok city and its greater area, which are called together Bangkok Metropolitan Region (BMR). Total population of BMR reaches 10.4 million and the area is about 7,761.7 km<sup>2</sup> within 79 counties in 2011 (Department of Provincial Administration, 2012). Before 1992 when the seventh national economic and social development plan (1992-1996)<sup>3</sup> from the central government was launched, the outskirt area obtain extreme infrastructure network.

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<sup>3</sup> National economic and Social Development Board office of the Prime Minister Bangkok : Development of Metropolitan Region and New Economic Zone, *the seventh National Economic and Social Development (NSED) (1992-1996)*, pp. 90-92, 1992

**Table II-1: Building coverage and Existing land use development in 1782 – 2007 of Bangkok**

(Source, Institute for Population and Social Research)

Year	Area (km <sup>2</sup> )	Population (people)	Built Coverage (km <sup>2</sup> )	Existing Land use (km <sup>2</sup> )				Description
				(Re)	(Com)	(Ind)	(Agri)	
1782	4.14	255,000	N/A	N/A	N/A	N/A	N/A	People lived in the city wall while remainder area was wasteland.
1900	13.32	600,000	N/A	N/A	N/A	N/A	N/A	Many canals and streets were constructed in the southern of the city.
1967	1,568.7	3,077,361	143.42	N/A	N/A	N/A	N/A	The city was expanded in every direction. Government promoted agricultural production and infrastructure caused by urbanization.
1986	1,568.7	4,697,071	347.39	180.99	17.835	23.614	588.42	Bangkok particularly extended to the north and the east. Some agriculture land use was turned to residential, commercial, and industrial.
1995	1,568.7	5,882,411	585.54	N/A	47.651	29.394	486.72	
2000	1,568.7	6,320,174	672.339	382.54	57.554	27.347	369.48	
2007	1,568.7	8,160,522	700.00	366.385	N/A	N/A	369.837	

Legend: (Re) = Residential Area (Ind) = Industrial Area (Com) = Commercial Area  
 (Agri) = Agricultural Area N/A = Not available area

Figure II-2 shows that rapid development of housing projects started flowing in outskirts area did not adequate many paddy fields area used to be spread since 1995. The including built-up area dramatically diffused from the city center to outskirts area of BMR as ribbon development particularly in vicinity area (Pathumthani, Samutprakarn, and Samutprakarn province). Bangkok city began to control standard of housing unit development through residential regulations and acts as shown in timeline of Figure II-2. However, national plan and urban planning policy (JICA and BMA, 1997) could not control city growth effectively. On the other hand, the plan and policy stimulated housing development in the large particularly in the northeast and northwest suburban of BMR along new road network as ribbon development. In case of the further planning it was also troublesome to control and allocate land for various land use, and to indicate direction of city growth. In addition, some researches about agricultural land use patterns in the north of urban fringe of Bangkok proved that difference of canal system reflects the difference residential type development. Many paddy fields became a low density of new housing developments and wastelands between 60's and 90's, because urbanized area along road network obstructed accessibility of other land use (Hara et.al, 2005). These situations have led to sprawl phenomena that was described in general urban sprawl definitions as disorder of low residential density development in suburban area, lack of multi-land use, and decentralized development on strip development (Gaster et.al, 2001).

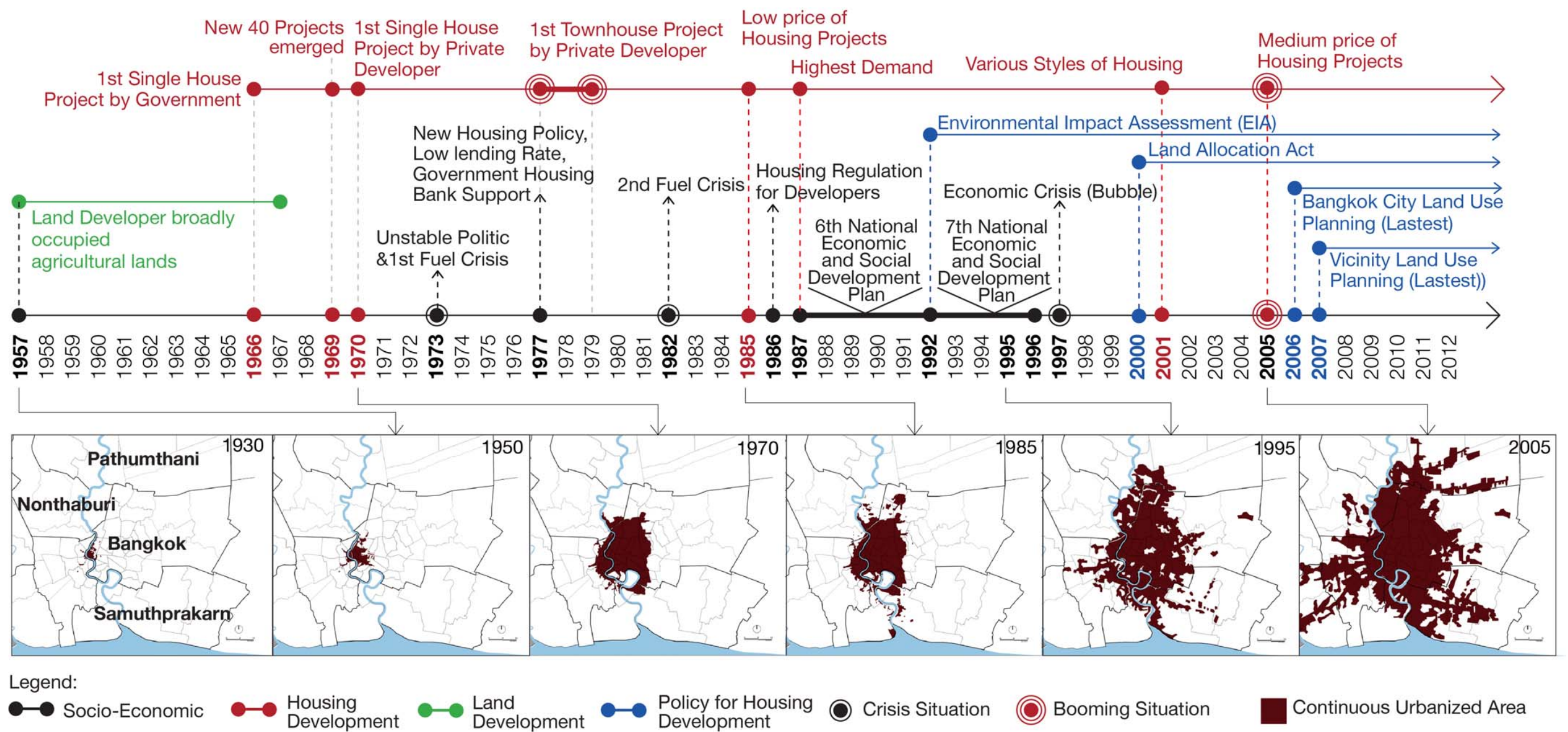


Figure II-2: Urbanization areas diffusion in Bangkok and greater area (1930-2010)

(Source: author, 2012)

### 2.2.1. Causes of sprawl situation in BMR context

Previous section mentioned briefly urban development of BMR, another cities also face on sprawl phenomena. Many sprawl researches strived to clarify causes of sprawl in various contexts in order to seek solutions for urban sprawl. The exploration causes of sprawl, which it is possible to put forward practicable counter-measures. For example, Overman and his team (2005) reviewed the urban economics literature during 1976-1992 that causes of sprawl involved with;

- Population growth: slow population growth, greater uncertainty regarding their future population growth
- Land development in urban fringe: a greater fraction of cities' urban fringe, the beginning with substantial unincorporated areas on the urban fringe
- Transportation: building around the car rather than around public transportation
- Economic: employment is not typically located close to the city center, local tax payers pay a smaller share of local government expenses
- Environment: climate is temperate
- Geographic: not surrounded by high mountains, terrain in their urban fringe is rugged

These possible causes related with socio-economic, influencing on population growth that response through land development and transportation on terrain of urban fringe. While early sprawl phenomena in European cities emerged in particular areas, where the rate of urban growth was already high before expanding to suburb area (EEA, 2006). Major drivers of urban sprawl in Europe are macro-economic factors, micro-economic factors, demographic factors, housing preferences, inner city problems, transportation, and regulatory frameworks. From this point, we revealed some common and distinct factors in Western countries that facing sprawl situation because of different context (Figure II-3). However, the sprawl phenomena in Asian cities also should be considered as the similar context of BMR.

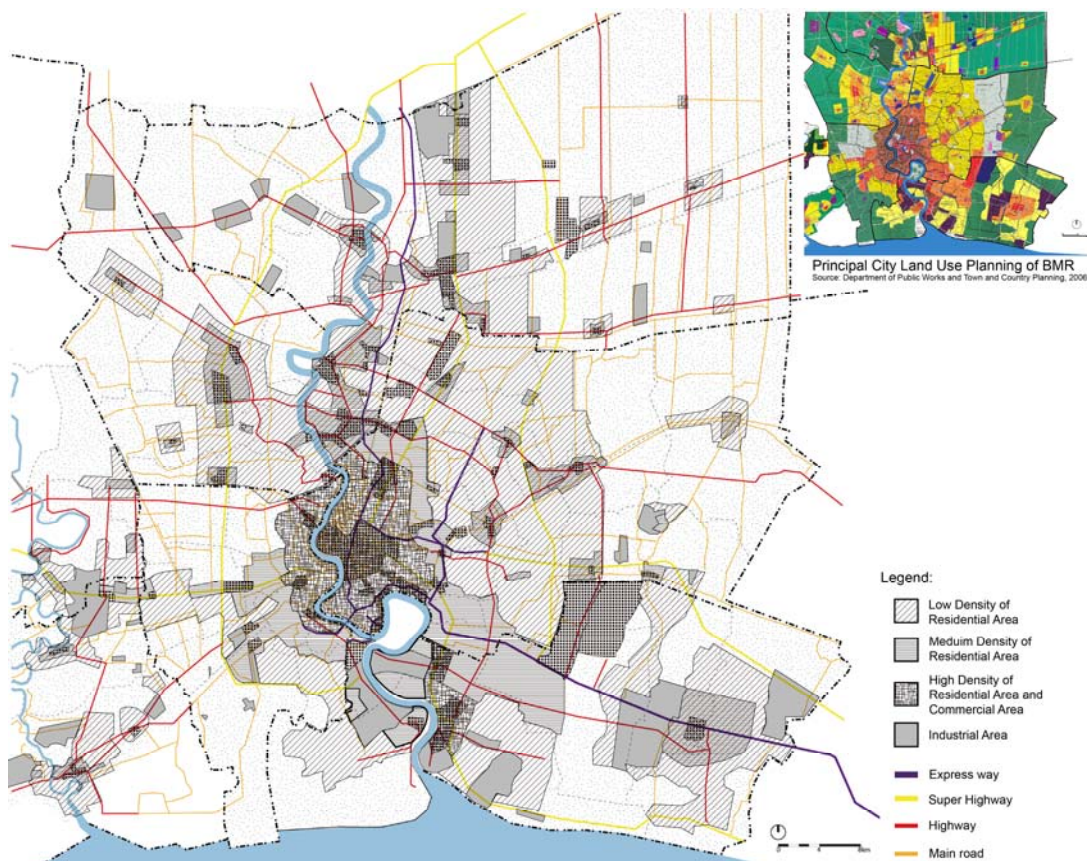
In case of Asian mega-cities, the explosive population growth has brought drastic changes to the urban landscape, causing uncontrolled development of urban regions, and expansion of squatters' settlements. This movement of migration has affected the pattern of spatial expansion, as causes of sprawl situation. In urban fringe of Metro Manila, the emergence of a new complex landscape results in mixture of agricultural and non-agricultural activities by squatter residential areas and subdivision development. They encroached the back marshland that had formerly been used as paddy fields (Murakami and Palijon, 2005). This reflects an important driver of sprawl in Manila is residential areas pattern. Urban sprawl in China has emerged in some regions during rapid urbanization period. Land development has been out of control and the construction land has kept expanding blindly, especially in the marginal areas of some



metropolises. The built-up area increased very fast and gradually formed a situation of extensive development via various spatial patterns including circularity expanding, sector growth, corridor radiation, leapfrog and in-filling development (Jiang et.al, 2007). Therefore, development of spatial patterns is a key factor of sprawl and becomes an indicator of sprawl measurement in Beijing.



**Figure II-3: Sprawl situation in different context**



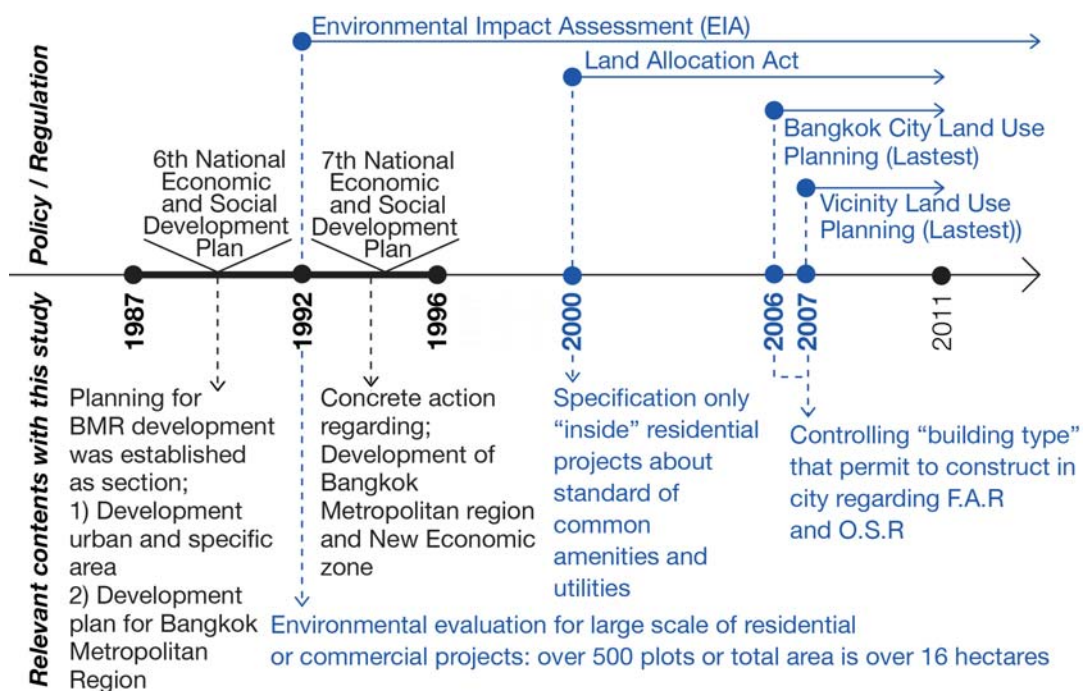
**Figure II-4: Residential land use of BMR**

(Source: author, 2013)



Beside causes of sprawl situation, as mentioned above, can indicate the unusual guideline of solutions on sprawl problems in each context. They also reflect the unique state of sprawl's characteristic in specific cases. Regarding the rise of sprawl phenomena in BMR context as described in previous section, the timeline in Figure II-2 obviously showed the influence of socio-economic on housing and land development with delayed housing policy. The style of urban development has been conducted by haphazard housing development, and then it has behaved as sprawl phenomena. However, state of sprawl in BMR is also not repeated as another cities.

One of milestone of BMR context is unbalance public transportation and infrastructure development in suburban area, after motivation from National Economic and Social Development Plans (1987 – 1996). In addition, the concept of decentralization of urban development is also promoted in these plans. The travel behavior of population becomes private automobile usage, especially in peripheral area. Second, an encouragement of this phenomenon is huge migration of population and high housing demand that affected by rapid urbanization. This requirement has been speedily responded by private sector. Third, the situation has been emerged in broad scale because of delayed housing regulation and urban planning in suburban area. Moreover, those plans are individually improvement and lacking of modernized implication (Figure II-5). If public sector effectively planned to support infrastructure before housing development by private sector expand, problems and impacts or rapid housing development would be less.



**Figure II-5: Lacking of modernized residential plans and regulations**

(Source: author, 2011)

Result in low-rise residential development has occupied the largest area as shown in Figure II-4, and has been continuing expanded in near future. While most of modern housing development is Gated Housing Project (GHP) development that briefly explained in Chapter I. The next consequence is rising of land use confusion because of low effective land use comprehensive plan. The condition is similar to sprawl in Manila that has overlapping between agricultural and residential land use.

All of causes and consequences are clarified above; create recognition state of sprawl phenomena in BMR. Therefore, we can summarize urban sprawl containing the following:

- Low density: creating further distance between residential and commercial land use, bring about increasing of private automotive vehicles
- Discontinuous development: motivating decentralization of urban development
- Land use: lacking of diversity that physical separation of land use
- Chronology of urbanized area expansion: speedy diffusion of built-up areas to peripheral BMR without well-preparation
- Huge migration: leading to higher housing demand and polarization between former citizen and newcomers
- Weak urban and land use planning: resulting in haphazard residential development by private developers (Figure II-5)
- Non-effective road network: encouraging ribbon development <sup>4</sup> and poor accessibility of residential settlement
- Low density of residential unit diffusion: encroachment of housing development on agricultural area

The significant features of sprawl in BMR seem to be low density of residential development, which diffuse on suburban area, remarkable in Figure II-4. Moreover, the importance of low-density development on sprawl development is affirmed by research of Altshuler and Gomez-Ibanez (1993). They edge a clearer definition of sprawl in terms of patterns of land development by identifying with term:

Continuous low density residential development on the metropolitan fringe, ribbon low density development along major suburban highways, and development that leapfrogs past undeveloped land to leave a patch work of developed and undeveloped tracts.

As the matter of fact, urban sprawl phenomena have been emerged rapidly in broad scale in BMR. It is known that GHP development is a major modern low-density residential development (as described in Chapter I). They occupy the large parts of the

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<sup>4</sup> Ribbon development is a feature of sprawl (Altshuler and Gomez-Ibanez, 1993) that means building houses along the routes of communications radiating from a human settlement. Ribbon development can also be ribbons of houses, factories, shop, etc.

sprawled area, it is important to understand relation between sprawl area growth and GHP development growth according to areas' character via spatial classification to clarify area characteristic in Chapter III. Hence, the study of GHP development becomes the main issue in this research.

### **2.2.2. Effect of sprawl development**

Although, we cannot prohibit this phenomena immediately, but urban planners and researchers keep seeking how to reduce its impacts, especially on quality of living of residents. The effects of sprawl development are broadly investigated as well. The main mutual impacts of urban sprawl are included below:

*Environmental dimension:* this impact is generally focused to evaluate communities whose development is the source of the sprawl phenomenon. From this perspective, the following environment impacts have been identified (Johnson, 2001); loss of environmentally fragile lands; reduced regional open space; greater air pollution; higher energy consumption; decreased aesthetic appeal of landscape (Burchell et al, 1998); loss of farmland; reduced diversity of species; increased risk of flooding (Adelmann, 1998); monotonous (and regionally inappropriate) residential visual environment; ecosystem fragmentation

*Travel and transportation dimension:* Result in fragmented street networks that separate urban activities more than need be, they produce poor regional accessibility (Ewing, R. H., Pendall, R., & Chen, D. D, 2002). Decentralization of the city and low density settlement patterns in urban sprawl have occurred and led to increasingly energy-intensive lifestyles and environmental pollution (Charoentrakulpeeti, 2006).

*Land use patterns dimension:* There is emerging of land use mixture of agricultural and non-agricultural activities in urban fringe area of Asian cities (Murakami and Palijon, 2005). The encroachment of developments, which are close to agricultural land in sprawl area, may lead to abandonment of land. This causes by poor accessibility that residential development blocks the access of land (Kelly, 1998 and Yokohari et al., 2000). Therefore, this mixture does not encourage the diversity of activities as a feature of compact city. On the other hand, it increases longer distance from residential to commercial area or employment center. Moreover, mixed urban-rural land use materialized by landform transformation practice is creating many environmental problems such as water pollution in canals (Hara et al., 2008).

*Social dimension:* Putnam (2000) has argued that low-density living reduces social capital and thus social interaction. Even though some urban economic researches against that consumers fail to consider reduced interaction benefits for their neighbors, not low-density living (Brueckner and Largey, 2008). However, low-density living provides more privatization via private gardens and distances between neighbors; this is a driver to depress the social interaction (Brueckner and Largey, 2008). Therefore low-

density living, which is one of primary feature of sprawl, seems as intermediary influenced factor between urban sprawl and social interaction of citizens. It also leads to other consequences in sprawl phenomenon. That is why this research focuses on low-density residential in sprawl area of BMR.

As conversation of sprawl phenomena and its impacts in BMR above, there are noticeable effects from sprawl development on urban scale that ranges from environmental problems to social problems. One of main cause of sprawling is haphazard development of gated housing project that has broadly occupied in peripheral area of BMR. Thus the study of gated housing development should be examined through literature reviews and overview observation in previous work. They will be explored in the next section.

### **2.3. Gated Housing Development in BMR**

This section aims to make clear understanding about gated housing project development in this research. Hence it explains study of gated communities in international perspective and BMR context, especially effects of gated housing projects at the end of section.

#### **2.3.1. General Gated Communities (GCs) study**

The ideas of enclosing territory with permanent structure have become since Roman era. Ancient walled towns were designed to protect inhabitants and their property, and the demands of defense required walls (Barnett, 1986). When the cities became larger, building walls to enclose whole area was costly to construction. Thus citizen living in town that was not imperial cities had to reduce scale and amount of walls' materials. They built the smallest possible perimeter as a compact circular wall (Barnett, 1986). Walls were used to protect against theft or destruction, but also control entry and exit during peaceful times. Medieval town walls followed Roman tradition and included a wall, a tower, and a gate for the guards to inspect goods and collect a toll (Howard, 1968). This made the town seem like an island, and held deep symbolic value as Lewis Mumford mentioned. His writes also point that the psychological importance of the wall was also important through creating a feeling of unity and security when the gates were locked at night (Mumford, 1961).

These systems make spatial segregation and class division that means for wealthy people to protect them from local population are also ingrained in Europe during sixteenth century. Because there was the resulting polarization of rich and poor increased a fear of social disorder and the risk of communicable diseases, the rich used the walls system to keep from restrictions placed on poor people and vagabonds (Lis & Hogo, 1979).

In the United State, early colonists walled the settlements of fort towns to protect them from attack but the virtual need for defensive walls is elimination of the indigenous population (King, 1990). During the 1850s, gated communities in the U.S. first originated for living on family estates and in wealthy communities; and as resorts in 1886 (Hayden, 2003). Between 1867 and 1905, the architect and real estate developer designed the majority of St. Louis's private streets, borrowing from the English private square to create exclusive residential enclaves for the business elite (Beito, Peter, & Alexander, 2002). It seem that the beginning of gated community in residential market in U.S for elite customers. But these early-gated preserves were different from the gated subdivisions of today. They were uncommon places for uncommon people. While the first place where middle-class Americans walled them off, was a planned retirement community in the 1960s and 1970s. Gates spread to resort and country club developments, and finally to suburban developments. In the 1980s, the era of dramatic demographic, economic and social change, there was a growing fear of crime. That was unrelated to actual crime trends or locations, and in the growing number of methods used to control the physical environment for physical and economic security. Since the late 1980s, gates have become ubiquitous, and by the 1990s they were common even in the northeastern United States (Setha, 2003). Americans who willing to live behind walls and gates, expecting to secure the value of their houses, reduce or escape from the impact of crime, and find neighbors who share their sense of the good life. The new fortress developments are predominantly suburban because gated communities need area where provide private common streets, sidewalks, parks, trails, playgrounds, etc. inside their walls and fences. However, their design features have their own regional style and distinction as a regional survey of 641 gated communities in major metropolitan cities of U.S. (Setha, 2003).

Even though the concept of gating and enclave residential area began from Europe and U.S., gated communities are also proliferating in many continents around the world. In each context, gated communities serve different purpose and express distinct cultural meaning. For instants, they provide a secure lifestyle in the face of extreme poverty in Southeast Asian, and protect residents from urban violence in South Africa. Gating is a global trend drawing upon U.S. models but also evolving from local architecture and socio-historical circumstances, and is always embedded within specific cultural tradition

Therefore gated communities become international issues that are argued on various aspects, especially impact from concrete physical barriers as walls, gates, and designated amenities on community and citizenship. There are extensive arguments range from advantage-side claim that the physical features of gated community promote safety and good relationship inside, to disadvantage-side raise that spatial and social segregation cause by features of gated communities. Hence, the consideration about gated communities' features should be examined within specific context of each city.

Gates and fences seem to be the significant physical factors that create isolation between residents who live inside and outside gates. As Edward Blakely and Mary Gail (1992) raised deep dimensions about manifestation of gates and fences follow;

Gates and fences around neighborhoods represent more than simple physical barriers. Gated communities manifest a number of tensions:

- (1) between exclusionary aspirations rooted in fear and protection of privilege and the values of civic responsibility;
- (2) between the trend toward privatization of public services and the ideals of the public good and general welfare;
- (3) between the need for personal and community control of the environment and the dangers of making outsiders of fellow citizens.

As reviews above, shows the diffusion of gated communities in Europe and America have similar origin from walled towns to protect inhabitants' property and to make spatial segregation and class division for wealthy people. Nowadays, gated communities have been proliferating in many regions around the world through serving distinct cultural meaning and purposes. In Southeast Asian, they provide a security of life because of huge gaps income in residential area. More comprehension of general physical elements of gated communities will be described in types of gated communities topic (section 2.4.2). The characteristic of gated housing project in BMR is explained in section 2.4.3 based on previous work of author. Beside the origins and functions of walls and fences of gated communities are revealed in former studies, the effects of gated communities also have been paid attention in various contexts. The principle effects of gated housing project in BMR context will be clarified in section 2.4.4.

### **2.3.2. Types of Gated Communities**

One of the most thorough investigations of typology of gated communities is discussed frequently via work of Blakely and Snyder (1997). They made a vital contribution to understanding the key characteristics of gated communities based on projects found in the USA. The categories represent ideal types that serve particularly markets in theoretical perspective, in the same time; communities may express a combination of features from these types.

As Blakely and Snyder mentioned in the reality, gated communities may present integration of characteristics from those types. Therefore, this literature was argued by research of Grant and Mittelsteadt (2004) because those gating project has a US focus. They can learn more about the diversity of practice in other countries and can see differences that warrant further consideration. They refined the typology of gated communities by adding variables to the classification frameworks. There are eight characteristics to elaborate the differentiate gated communities; functions of enclosure, security features and barriers, amenities and facilities included, type of residents, tenure,

location, size, and policy context. However, the most significant visible feature of ‘enclosure’ is gates and fences as the signature of gated communities. Planners and scholars may understand the term ‘gated’ in various ways. ‘Walled’ and ‘gated’ communities are sometimes seen as synonymous, but clearly involve different levels of enclosure (Table II-2 and 3).

**Table II-2: Bakely and Snyder’s (1997) general typology of gated community**

(Source: adapted from Grant and Mittelsteadt (2004))

Types	Features	Characteristics	Original idea	Key factors
Lifestyle	These projects emphasize common amenities and cater to a leisure class with shared interests; may be urban villages, luxury villages, or resort villages	Age-related complexes with suite of amenities and activities	Developers hope to attract residents searching for identity, security, and shared lifestyle with neighbors. Security may be secondary to the amenities offered in community (Marketing leisure)	Amenities and facilities
		Shared access to amenities for an active lifestyle		
		Master-planned project with suite of amenities and facilities		
Prestige	These projects reflect desire for image, privacy, and control; they focus on exclusivity over community; few shared facilities and amenities	Secured and guards privacy to restrict access for celebrities and very wealthy; attractive location	This types based on the level of affluence of residents. Gates prevented the masses from seeing how wealth they live. The desire of those within to avoid contact with the public	Level of affluence
		Secured access for nouveau riche; often have guards		
		Restrict access; usually without guards		
Security zone	These projects reflect fear; involve retrofitting fences and gates on public streets; controlling access	Enclosed urban neighborhoods with particular character or exclusive homes	Walls and fences are erected to deter crime or limit traffic	Type of security features and Spatial patterns
		Restrict public access in inner city area to limit crime or traffic	The desire of communities on the urban periphery to prevent access for nonresidents	
		Not fully gated communities; closed some streets to limit through traffic	Residents petition to city to close of some street to restrict access; from grid layout turned into suburban pattern of cul-de-sac street.	

When considered literature review in GCs based on western cities, classification of typology of GCs is categorized through an initial ideas (Table II-2) and a continuum of enclosure (Table II-3). We highlight grey cells of table to refer to similar features and characteristics of GHP in BMR. From Table II-2 reflects characteristics of GHP in BMR are matched with ‘prestige community’ that these projects reflect desire for image, privacy, and control. We can assume that GHP in BMR create image of affluent to inside residents through features of secured access. Meanwhile, Table II-3 reflects level of enclosure of GCs, the study found boundary and road access of GHP correspond with high level of enclosure.

However, the green cells are highlighted to reflect similarity of features and characteristics of housing project without control access (HP) including former village (FV). The level of enclosure of HP and FV is low because they have opaque fence or wall and faux-guard entries without restrict access. Next section will describe situation of gated housing development in BMR.

**Table II-3: Classifying gated communities through a continuum of ‘enclosure’**

(Source: Grant and Mittelsteadt (2004))

Type	Boundary	Road access	Notes
Ornamental gating	No marked boundary	Landmark gates at entry	Feature gates showing the subdivision name are placed at the major entries to give identity to an area
Walled Subdivision	Opaque fence or wall	Open	Fully walled subdivisions are a common suburban feature in western Canadian cities. Cars and pedestrians may enter
Faux-gated entries	Opaque wall or fence	Narrowed entry, removable chains or bollards, guard house	Some subdivisions have physical features that look like guard house or private entries to discourage uninvited vehicles from entering
Barricaded streets	No marked boundary	Public streets closed by fences, planters, or concrete barriers	Many cities barricaded streets creating cul-de-sac streets within the grid as a form of traffic control. Pedestrian access remains open.
Partially gated roads	No marked boundary	Lift or swing arm	Rural cottage subdivisions may feature gates that are only closed for part of the year, may have gates but no walls. Pedestrian access is open.
Fully gated roads	Natural features such as water or ravines	Lift or swing arm	Prestige communities on island, peninsulas, or remote areas may limit access through combined natural and man-made features
Restricted entry bounded areas	Fence or wall, and/or natural features that limit access	Gate with limited control access	Suburban communities may completely restrict public access: video or telephone systems may allow visitors to be vetted by residents
Restricted entry, guarded areas	Fence or wall, and/or natural features that limit access	Gate with limited control access; security guards, police or army	Suburban communities may completely restrict public access: video or telephone systems may allow visitors to be vetted by residents. US-style gated communities have guards at the gated or patrolling the premises.

Note: ‘Grey’ means characteristics of GHP in BMR ‘Green’ means characteristic of housing project without control access

### 2.3.3. Typical Gated Housing Project Development in Bangkok Metropolitan Region and related regulations

The physical characteristic of low-rise housing unit is defined in building code in 2000, including residential building, townhouse, and semi-detached house as follow;

“...Residential building means a building for living whether temporary or permanent residence”

“...Townhouse means a building that is divided more than two units by walls. It made by whether fireproof or non-fireproof materials. The purpose of this building is only for living. Each unit provides front and rear open space between the building and land boundaries. The height of townhouse is limited at three stories.”

“...Semi-detached house means a residential building that is divided into two units with sharing walls. Each unit provides front, rear, and side open space between building and land boundaries. It also has separated entrance in each unit.”

“...The ‘housing development’ means a housing project that is operated by ‘developer’ who allocates land to small plots for sale. These plots include any types of low-rise housing units (detached houses, townhouses, and semi-detached houses).

To improve quality of living for residents inside GHP and make standard of environment in GHP, the regulation of land allocation for residence and commerce in Bangkok has become effective since 2007 (Department of Lands, 2007). This regulation



clearly determines the basic elements for GHP in BMR. The developer must provide 'common areas' such as a playground, a common garden, and a club; 'standardized public utility' and other system to support quality of life for inside residents. Moreover, the juristic committees of GHP that come from residents are also specified as community management system. This system is prospected to make sustainable community after full occupancy of residents within the project. However, the other elements such as 'gate' and 'security guard' are not fixed in the regulation. This preparation bases on consideration of private developers. The gate and security guard are always used in marketing strategy to create image of affluent and sense of safety. The effects from this conduction are still not clearly investigated, then this research will examined this kind of development to figure out the way to reduce impacts on residents inside and outside GHP.

## 2.4. Findings and Conclusion

The sprawl phenomenon is examined through field survey observation of current situation and problems. From this point, we can realize; what are effects of uncontrolled sprawl development, what are main drivers of sprawl in BMR context.

(1) We found low-density living is an influenced driver that has occupied broadly in sprawl area and lead to several problems, especially on social relationship of residents. In BMR context, the biggest market share of housing estate is modern housing project development, which provides clear boundaries and controlled communities' accessibility, named as gated housing project (GHP) development. In other words, GHP development is an important intermediary factor that simultaneously affects both urban scale and community scales. Hence, how to improve GHP towards effect reduction on social relationship becomes the research question.

(2) The section revealed characteristic of sprawl development in BMR context. We can summarize urban sprawl containing the following:

- Low density: creating further distance between residential and commercial land use, bring about increasing of private automotive vehicles
- Discontinuous development: motivating decentralization of urban development
- Land use: lacking of diversity that physical separation of land use
- Chronology of urbanized area expansion: speedy diffusion of built-up areas to peripheral BMR without well-preparation
- Huge migration: leading to higher housing demand and polarization between former citizen and newcomers
- Weak urban and land use planning: resulting in haphazard residential development by private developers

- Non-effective road network: encouraging ribbon development <sup>5</sup> and poor accessibility of residential settlement
- Low density of residential unit diffusion: encroachment of housing development on agricultural area

(3) State of GHP development impacts in BMR context are revealed following;

- Rising of community isolation in residential area: because the principle elements of GHP such as extraordinary gates, solid walls, and highly strict access, lead to heterogeneity between inside and outside GHPs' residents. In addition, they also unintentionally obstruct former villagers' accesses that result in isolated from road network.
- Land use confusion: Sprawl area has broadly expanded to peripheral area of BMR with uncontrolled GHP development diffusion and ineffective land use planning. Consequences, prior agricultural land use has been threaten by low-density residential land use in some areas. For non-active former agriculturists, they have to totally change the way of life without any support. Meanwhile, active agriculturists are facing environment pollution on their fields.
- Traffic congestion: Besides the unbalance between infrastructure development and public transportation, create increasing demand of private automobile and then traffic congestion in regional scale. The high density of GHP in insufficient infrastructure also brings about traffic congestion in municipal scale. Moreover, one GHP provides too many housing units but has only one community's access; this sense also leads to traffic jam in community scale. Thus it affects on dairy life of GHPs' residents and surrounding inhabitants.

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<sup>5</sup> Ribbon development is a feature of sprawl (Atshuler and Gomez-Ibanez, 1993) that means building houses along the routes of communications radiating from a human settlement. Ribbon development can also be ribbons of houses, factories, shop, etc.

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# CHAPTER III

## Sprawl Classification in Bangkok Metropolitan Region Context

### 3.1. Introduction

Findings in Chapter II obviously emphasize the importance of GHP development study based on sprawl phenomenon in BMR context, and specific sprawl features in BMR. This chapter focuses on further investigation of sprawl development through classification and comprehension of GHP diffusion. Thus, it is necessary to create a specific sprawl measurement in BMR context. The assumption of this chapter is that different parts of BMR bring out distinctive sprawl states.

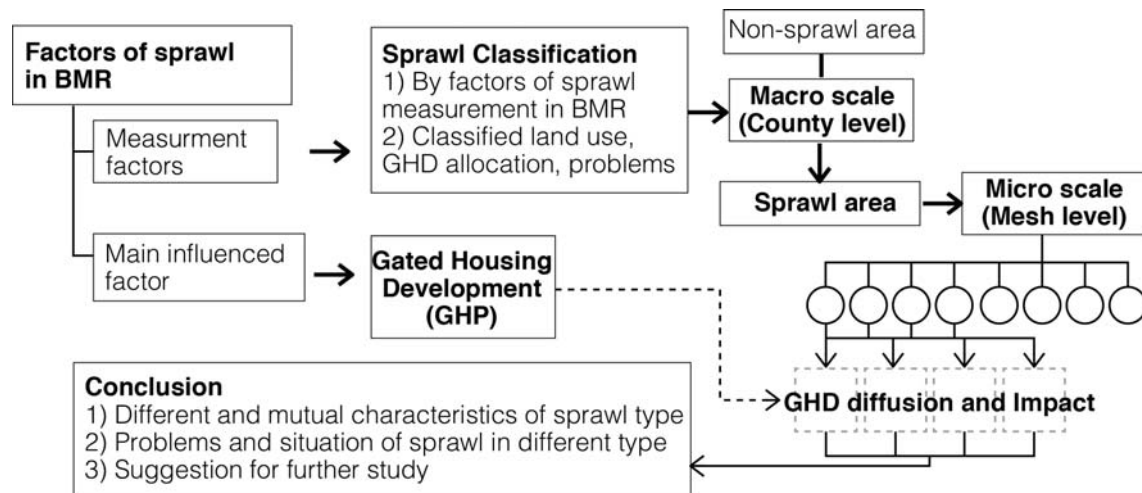


Figure III-1: Structure of Chapter III

(Source: author, 2012)

Regarding conservation of sprawl phenomena as international issues, there are many previous studies in Western and Asian context. Literature review is important for the beginning of study, and consideration about physical observation from Chapter II is used to design criteria for sprawl measurement. Then,

identification of sprawl area in macro scale is applied to divide sprawl and non-sprawl area of BMR, followed by, micro scale categorization (Figure III-1). We found distinct four types of sprawl and explanation about their individual characteristics in each type, especially GHP diffusions and problems. Thereafter, the characteristic of each state in different location was examined by qualitative analysis, namely, land distribution and land configuration and allocation by case study area illustrated map, and speed of land use transformation or urbanization by historical aerial photograph evolution. Finally, we can realize the critical sprawl area that should be selected as research case study for the social relationship evaluation in the next chapter.

### **3.2. Literature review of Sprawl Measurement**

Main researches of sprawl and urban development are referring to basic process to distinguish sprawl definition and qualification. However, there is no common definition of sprawl. As definition of sprawl in terms of pattern and land development, sprawl is a continuous low-density residential development on the metropolitan fringe, low density ribbon development along major suburban highways, and leapfrogs development to leave a patchwork of developed and undeveloped lands. An analysis of definitions of sprawl in the social science and planning literature suggests that definitions of sprawl can be grouped into various categories.

Although sprawl situation is similar in many cities, but methodology to measure the extent of sprawl is various based on data source and cause of sprawl in different context that created unique indicators in different study areas. Most of the overseas studies commonly used multi-indices by GIS analysis or statistical analysis in various aspects, common indices include: growth rate (population or built-up area), density (population, residential, employment), and spatial configuration (fragmentation or proximity). This method needs in depth database from public organization data, for instant, using Traffic Analysis Zone (TAZ) data for employment density (jobs/mile<sup>2</sup>) calculation to measure sprawl in concentration factor, hence, some indices based on Western urbanization context. Then, these indices are calculated and used for whole city analysis, which could precisely reflect sprawling situation and compare with another cities.

Beijing's cause of sprawl was defined as an excessive urban expansion. The indices are used spatial configuration (area index and shape index), growth efficiency (horizontal density index and vertical density index), external impact (agricultural impact index and open space index). These measurement indices are necessary statistic data. Unfortunately, they are not successive enough to calculate certain indicators and they are not appropriate to directly apply all indices and methods to measure sprawl in BMR.

This research proposes sprawl indicators for measuring sprawl based on the case of Bangkok Metropolitan Region in Thailand according by sprawl causes and consequences.

### **3.3. Indicators of sprawl measurement in BMR context**

General urban sprawl definitions are an urban growth pattern with disorder of low density development, lack of multi-land use, and decentralized development. Based on BMR situation, sprawl refers to disorderly growth of residential land with low-efficient infrastructure towards suburban and vicinity area. According to sprawl situation in this study, 9 indexes as shown in Table III-1 were driven measurement of sprawl from macro to micro scale. As Land use Planning (LP), Migration Rate (MR), Period of urbanized area diffusion (PU), and Efficiency of infrastructure (EI) are composed from causes of existing sprawl situation in BMR, while Density of housing unit (DH), Density of urbanized area (DU), Land use (LU), Diversity of land use (DLU), and Decentralized development (DD) are from basic sprawl factors of measurement. LP, MR, and DH divide sprawl area from non-sprawl area such as inner city and rural area, and identified sprawl location by database in county level. Because sprawl phenomenon is a fragmental development, county level classification could not be well depicted interior sprawl characteristics. It is necessary to convert county data to mesh data by DU, LU, and PU. Dimension of sprawl area qualification is revealed in this stage, namely, understanding about age of area, developed area in each land use to examine sprawl development of BMR. Then remaining three factors (DLU, DD, and EI) are applied to evaluate the characteristic of sprawl area in different sprawl situation. The process of sprawl classification in this research is shown in Figure III-2.



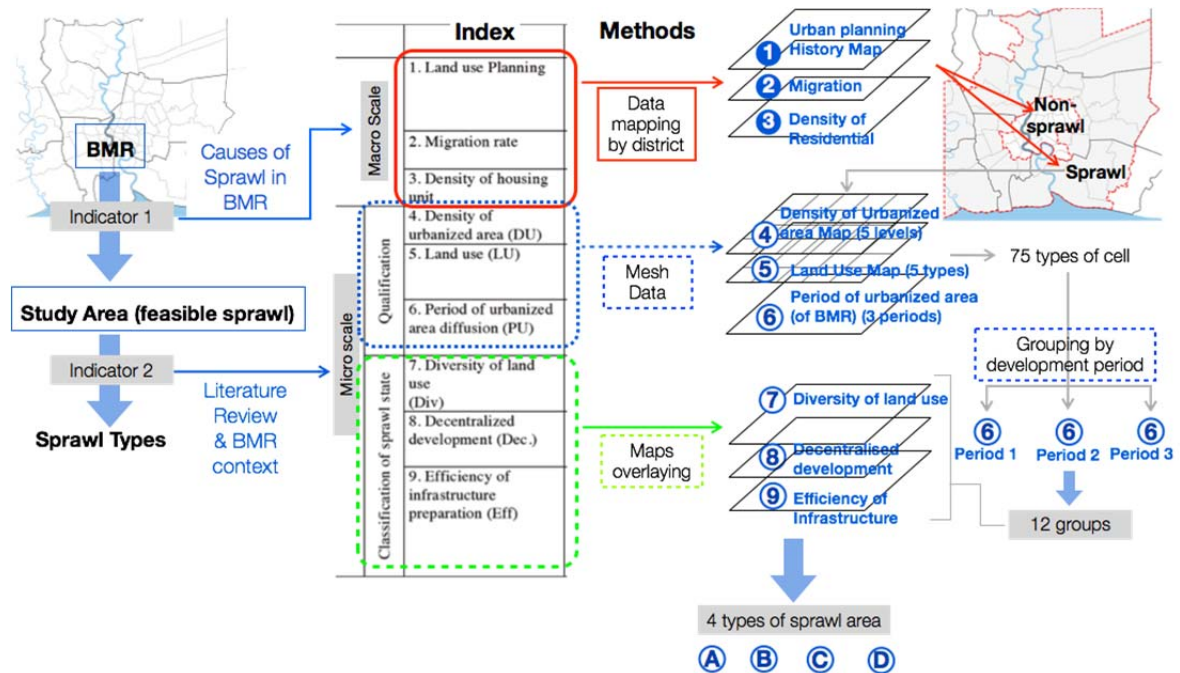


Figure III-2: Sprawl measurement process in BMR context

**Table III-1: Factor for measurement sprawl development and its utilization**

	Factor	Meaning	Sprawl concept	Implementation	Data source	Purpose
Macro Scale	1. Land use Planning (LP)	Revision of land use comprehensive planning	Weak planning	Many times of planning revision = well planning Few times of planning revision = weak planning	Land use comprehensive map in 1996, 1970, 1999, 2001,2005,2006,2007, 2009	To identify location of sprawl area and can separate sprawl and non-sprawl area (County level from 79 to 21 counties)
	2. Migration Rate (MR)	Population growth rate	High migration	Gradually in crease of population growth	Population growth 1998 - 2012	
	3. Density of housing unit (DH)	Number of housing unit in one square kilometer	Low density of housing unit	Low = below average of housing density of BMR	Density of housing unit in 2012	
Micro Scale	Qualification	4. Density of urbanized area (DU)	According to emerging of sprawl refers to developed area of low residential since 1987 as primary qualification of sprawl in BMR	Converting vector map to grid	GIS vector data	To understand land use and growth of sprawl (From 21 counties to 12 groups of land use of sprawl)
		5. Land use (LU)		Converting land use map to grid	Land use comprehensive plan	
		6. Period of urbanized area diffusion (PU)		1985 - 1995 = Period 1 (P1) 1995 - 2005 = Period 2 (P2) 2005 - present = Period 3 (P3)	After national planning established	
	Classification of sprawl state	7. Diversity of land use (DLU)	Single land use, low mixture of land use	Single land use = high sprawl Multi land use = low sprawl	Overlay analysis, Diversity map and map of 12 groups of LU	To classify state sprawl area (4 sprawl types)
		8. Decentralized development (DD)	Ribbon development	Highly developed area on principle or minor arterial road	Overlay analysis, Density of urbanized area map and road network map	
		9. Efficiency of infrastructure (EI)	Low-efficient infrastructure	Developed without planned (DWP) = highly developed area on local or non-street Planned without developed (PWD) = low developed area on principle or minor arterial	Overlay analysis, Density of urbanized area map and road network map	

### 3.4. Identification of sprawl area in Macro scale

According to the sprawl measurement concept mentioned above, density is a basic criterion to evaluate sprawling. At first, we check how the location of sprawl area could be clarified by housing density. All of 79 counties in BMR are not in sprawl situation; therefore, we have to divide non-sprawl area so we can regard that using statistic evaluation by sorting value of MR, DH, and LP. Before evaluation, the value is given in range of data as follow:

- 1) Three ranges of migration rate are below 0.00% as declining, 0.01% – 1.99% as stable or slightly increasing, and above 2.00% as dramatically increasing.
- 2) Three ranges of housing density are below 2,000 units/km<sup>2</sup> as low, 2,001-3,000 units/km<sup>2</sup> as medium or average, and above 3,001 units/km<sup>2</sup> as high.
- 3) Two types of number of planning revision are 0-2 times as not-well planning, and 3-4 times as well planning. Here we evaluate each district by substituting a given range of factors as mentioned. In any sprawl definition, high migration, low density of housing, and not-well planning can be seen as in Figure III-3. We can recognize districts where sprawl area emerges in peripheral area between rural and urban fringe.

Generally sprawl area locates in partial vicinity area, including Nonthaburi, Pathumthani, Samuthprakan, and Samuthsakhon province, and perimeter of eastern and western Bangkok. The name list of 21 counties with sprawl is in the table of Figure III-2. They will be screened to analyze sprawl qualification and classification of sprawl state, recognized, and examined in next section.



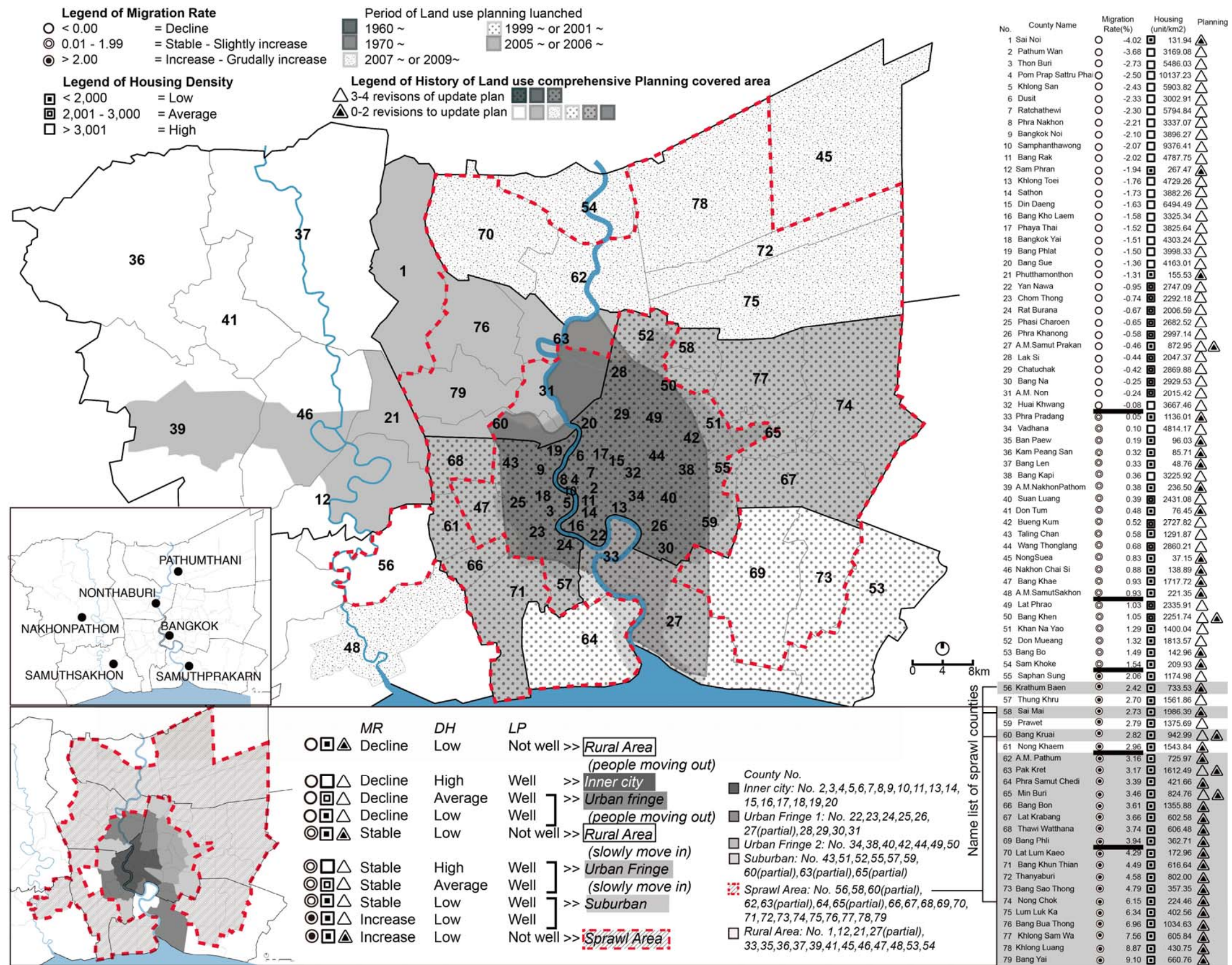


Figure III-3: Location of sprawl and Non-sprawl Area in BMR

(Source: author, 2012)

### 3.5. Characteristic of sprawl area and Classification of sprawl state in Micro scale

In this section, we investigate the selected sprawl areas (21 counties in Figure III-4) according to remaining factors in table 1: DU, LU, and PU with similar condition. DU is applied to arrange proportion of developed area occupation in 1x1 km<sup>2</sup> into five levels, then, the areas overlapped with LU are divided into five types of land use because different levels of developed area in the same land use can be recognized.

Next, PU (three periods in sprawl area) is overlaid and the outcome is included in 75 types of cell. This leads to an understanding of main characteristic in a group as shown statistic in Table III-1. In order to recognize land use development of sprawl phenomena, we plot cells in different period (PU) as shown in Figure III-5. The result reveals groups of similar land use and density in the same period into 12 groups of sprawl land use.

According to Figure III-4, the newly developed (after 2005) areas are 5 groups as follow;

- 1) low developed agricultural land use (0A-50A)
- 2) low developed low-residential land use (0R-50R)
- 3) low developed medium-residential land use (0M-25M)
- 4) low developed commercial and official land use (0C-25C)
- 5) low developed industrial land use (0I-50I).

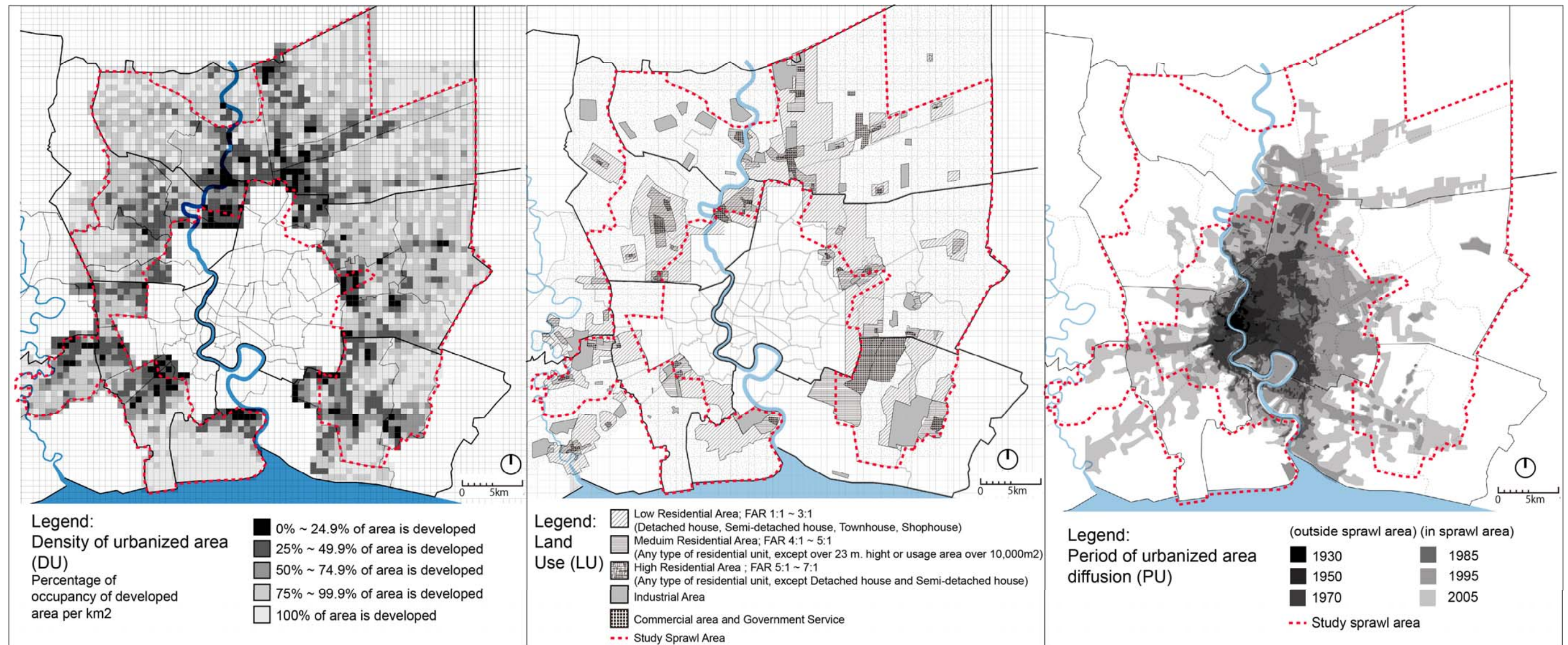
While the previously developed area (1995-2005) included other 5 groups:

- (1) highly developed agricultural land use (75A-100A)
- (2) highly developed low-residential land use (75R)
- (3) medium developed medium-residential land use (50M)
- (4) medium-highly developed commercial land use (50C-100C)
- (5) highly developed industrial area (75I-100I).

Lastly, the primitive developed area (1985-1995) consists of 2 groups:

- 1) very highly developed low-residential land use (100R),
- 2) highly developed medium-residential land use (75M-100M).





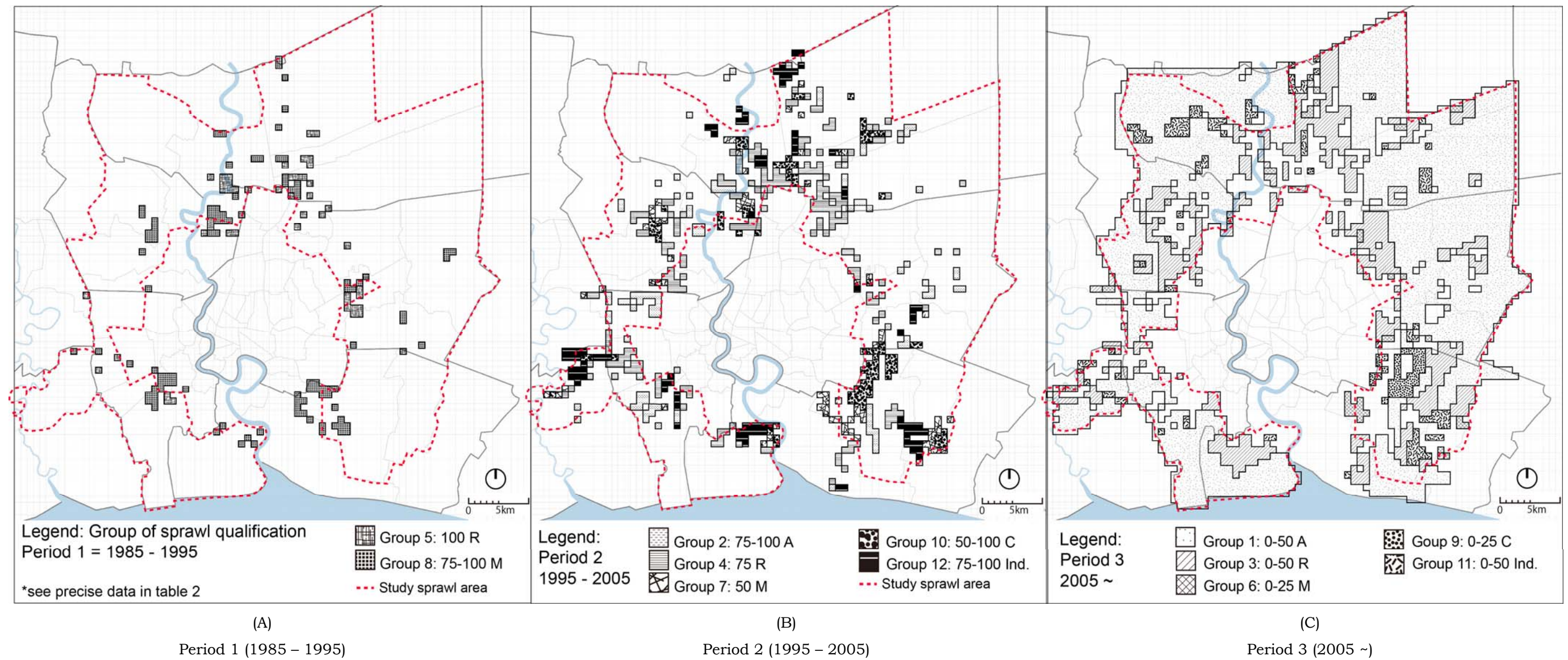
(A)  
 Density of urbanized area (DU)

(B)  
 Land use (LU)

(C)  
 Period of urbanized area diffusion (PU)

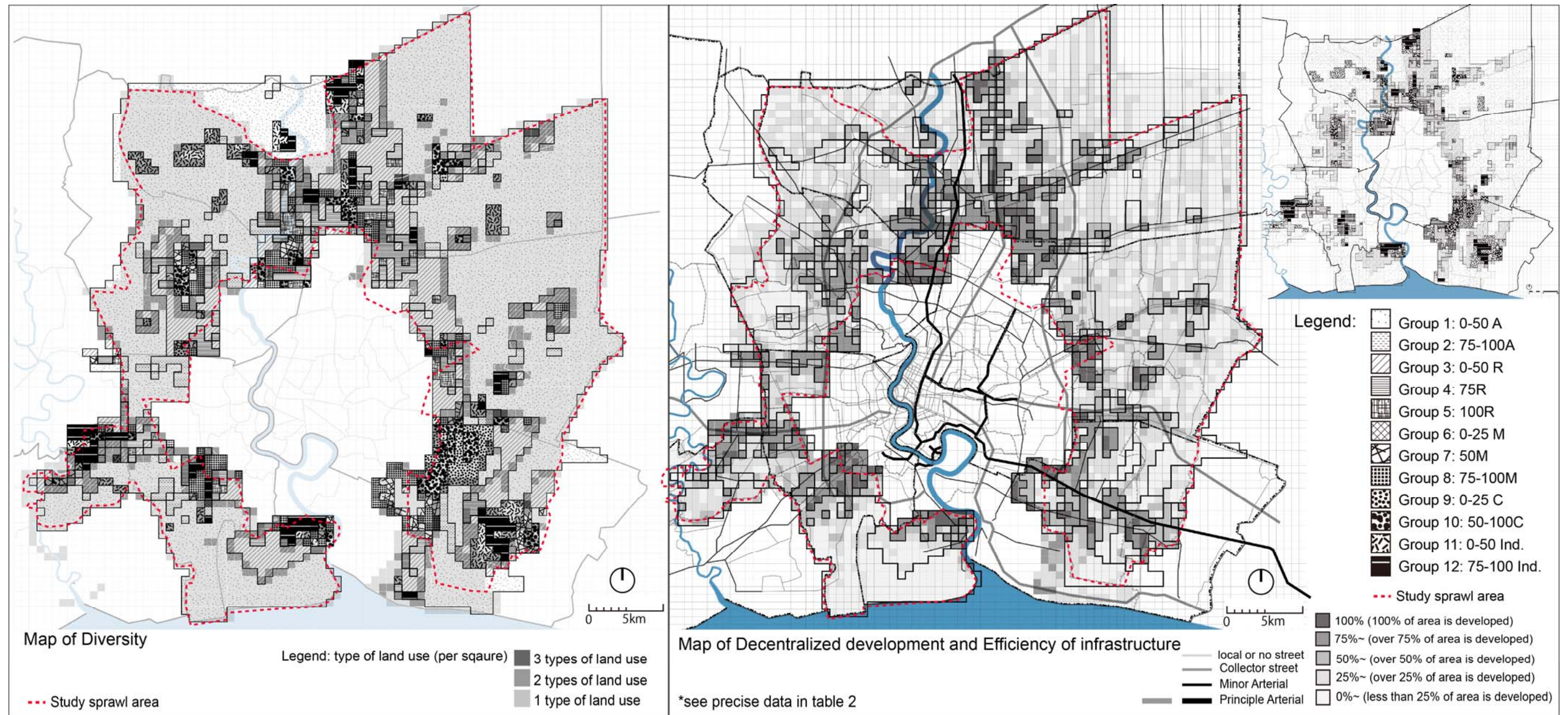
**Figure III-4: Factors for sprawl qualification by mesh data analysis**  
 (Source: author, 2012)





**Figure III-5: 12 groups of sprawl land use**  
 (Source: author, 2012)





(A)  
Map of diversity

(B)  
Map of Decentralized development and Efficiency of infrastructure

**Figure III-6: 12 groups on DLU, DD, and EI factor**  
(Source: author, 2012)



With these groups, we can make an assumption of study that different type of urban sprawl cause to different consequences and to specific problems and solution for each area. Therefore, the remaining sprawl measurement factors become the main indicators to classify these groups. The study applied 12 groups of speculation map with overlay analysis as shown in Figure III-6. Their details and methods are described as follow;

**(1) Diversity of land use (DLU) – Single land use:** the sprawl feature is a separation of different kind of land use into distinct areas. Single land use would expect increasing the inconveniences such as traffic congestion, trip lengths, and travel times, while diversity would not. Therefore, land use planning map (Figure III-6) is applied to diversity analysis by identifying number of land use type in one square that ranges within three groups: 1 type, 2 types, and 3 types. Although, this factor is similar to LU, but DLU aims to emphasize the edge of land use, where is feasible to blend function with nearby land use. Group that contains large area of single land use has a high sprawl-like on this dimension.

**(2) Decentralization development (DD) - Ribbon development:** Due to lack of well planning and project development planning, it results in a missing function of land development. There are a lot of housing developments built along a principle or minor arterial, a road to connect between cities or regions, so called ribbon development. This consequence is an obstruction of access from behind land to the road and aggravation of rare land potential. In order to investigate decentralized area (ribbon development), this study considers highly developed area (75%-100%) that locates along the principle and minor arterial road.

**(3) Efficiency of infrastructure (EI) – Inefficient infrastructure:** many reports of urban planning in BMR by relevant public sectors mentioned about consequence of non-systematic road network in BMR as haphazard development, a development without plan (WP). This is illustrated with highly developed area (75%-100%) settled on a local or narrow street not the arterial, which can reflect inadequate infrastructure, that effect on living environment and transportation. On the other hand, the planned area with low development, called planned without developed area (WD), is also indicated inefficient infrastructure. They have low developed area (0%-25%) locating on the principle or minor arterial. These low developed areas have vacant or waste space waiting for urbanization.

Table III-2 shows groups of sprawl land use allocated into sprawl type according to three factors as mentioned above. Number of cells of 75 types in 12 groups of sprawl land use is shown in percentage of area in Table III-2. Meanwhile, the value in sprawl situation column is shown both percentage and z-score because it could be compared and degreed situation of sprawl. Finally, results are revealed 4 types of sprawl situation that will be investigated more in next chapter.

**Table III-2: Location and Level of Sprawl Area in BMR**

12 Groups of sprawl land use								4 Types of sprawl situation								
Group	Code	Fig.III-3(B)	Fig.III-3(A)	Fig.III-3(C)				Fig.III-5(A)		Fig.III-5(B)		Fig.III-5(B)		Fig.III-6		
		Land use*	Dens*	Period 1	Period 2	Period 3	Total	Diversity (DU)		Decentralized (DD)		Efficiency (EI)		Sprawl type		
				%(cell)	%(cell)	%(cell)	%(cell)	%	Z-score	%	Z-score	%	Z-score			
G1	0A	Agricultural	0%~	1.15(9)	4.73(37)	94.13(737)	100.00(783)	Single 96.25	1.62 (H)	Non-Ribbon 0.00	-0.92 (L)	WD 10.04	-0.90 (L)	H-L-L	A	
	25A	Agricultural	25%~	0.80(7)	7.45(65)	91.74(800)	100.00(872)									
	50A	Agricultural	50%~	2.98(5)	33.33(56)	63.99(107)	100.00(168)									
	Total			1.158(21)	8.67(158)	90.18(1644)	57.17(1823)									
G3	0R	Low-Residential	0%~	3.53(3)	8.24(7)	88.24(75)	100.00(85)	Single 62.21	-0.15 (L)	Non-Ribbon 0.00	-0.92 (L)	WD 9.39	-0.94 (L)	L-L-L		
	25R	Low-Residential	25%~	6.53(16)	19.59(48)	73.88(181)	100.00(245)									
	50R	Low-Residential	50%~	12.08(18)	30.87(46)	57.05(85)	100.00(149)									
	Total			7.72(37)	21.09(101)	71.19(341)	15.02(479)									
G6	0M	Medium-Residential	0%~	30.00(3)	20.00(2)	50.00(5)	100.00(10)	Single 56.82	-0.43 (L)	Non-Ribbon 0.00	-0.92 (L)	WD 15.91	-0.53 (L)	L-L-L		
	25M	Medium-Residential	25%~	5.88(2)	29.41(10)	64.71(22)	100.00(34)									
	Total			11.36(5)	27.27(12)	61.36(27)	1.38(44)									
G7	50M	Medium-Residential	50%~	16.88(13)	45.45(35)	37.66(29)	100.00(77)	Single 53.25	-0.61 (L)	Non-Ribbon 0.00	-0.92 (L)	WD 3.90	-1.28 (L)	L-L-L	B	
	Total			16.88(13)	45.45(35)	37.66(29)	2.41(77)									
G9	0C	Commercial/Official	0%~	33.33(4)	25.00(3)	41.67(5)	100.00(12)	Single 55.32	-0.51 (L)	Non-Ribbon 0.00	-0.92 (L)	WD 6.38	-1.13 (L)	L-L-L		
	25C	Commercial/Official	25%~	8.57(3)	14.29(5)	77.14(27)	100.00(35)									
	Total			14.89(7)	17.02(8)	68.09(32)	1.47(47)									
G11	0I	Industrial	0%~	5.88(1)	11.76(2)	82.35(14)	100.00(17)	Single 30.19	-1.80 (L)	Non-Ribbon 0.00	-0.92 (L)	WD 19.81	-0.29 (L)	L-L-L		
	25I	Industrial	25%~	3.51(2)	21.05(12)	75.44(43)	100.00(57)									
	50I	Industrial	50%~	6.25(2)	43.75(14)	50.00(16)	100.00(32)									
	Total			4.72(5)	26.42(28)	68.87(73)	3.32(106)									
G8	75M	Medium-Residential	75%~	60.61(40)	28.79(19)	10.61(7)	100.00(66)	Single 61.00	-0.21 (L)	Ribbon 50.00	1.61 (H)	WP 26.00	0.10 (H)	L-H-H		
	100M	Medium-Residential	100%~	55.88(19)	32.35(11)	11.76(4)	100.00(34)									
	Total			59.00(59)	30.00(30)	11.00(11)	3.14(100)									
G10	50C	Commercial/Official	50%~	26.32(5)	68.42(13)	5.26(1)	100.00(19)	Single 46.07	-0.98 (L)	Ribbon 30.34	0.61 (H)	WP 29.21	0.30 (H)	L-H-H	C	
	75C	Commercial/Official	75%~	14.63(6)	53.66(22)	31.71(13)	100.00(41)									
	100C	Commercial/Official	100%~	31.03(9)	44.83(13)	24.14(7)	100.00(29)									
	Total			22.47(20)	53.93(48)	23.60(21)	2.79(89)									
G2	75A	Agricultural	75%~	3.30(3)	51.65(47)	45.05(41)	100.00(91)	Single 86.87	1.12 (H)	Ribbon 31.31	0.66 (H)	WP 35.35	0.69 (H)	H-H-H		
	100A	Agricultural	100%~	12.50(1)	75.00(6)	12.50(1)	100.00(8)									
	Total			4.04(4)	53.54(53)	42.42(42)	3.10(99)									
G4	75R	Low-Residential	75%~	18.28(34)	48.92(91)	32.80(61)	100.00(186)	Single 70.43	0.27 (H)	Ribbon 32.26	0.71 (H)	WP 40.86	1.03 (H)	H-H-H	D	
	Total			18.28(34)	48.92(91)	32.80(61)	5.83(186)									
	100R	Low-Residential	100%~	42.86(21)	40.82(20)	16.33(8)	100.00(49)									
G5	Total			42.86(21)	40.82(20)	16.33(8)	1.54(49)	Single 91.84	1.37 (H)	Ribbon 32.65	0.73 (H)	WP 51.02	1.67 (H)	H-H-H		
	75I	Industrial	75%~	10.53(6)	64.91(37)	24.56(14)	100.00(57)									
G12	100I	Industrial	100%~	36.36(12)	48.48(16)	15.15(5)	100.00(33)	Single 71.11	0.31 (H)	Ribbon 42.22	1.21 (H)	WP 44.44	1.26 (H)	H-H-H		
	Total			20.00(18)	58.9(53)	21.1(199)	2.82(90)									
TOTAL				7.7(244)	20.0(637)	72.4(2308)	3189	65.15 19.45		18.23 19.77		24.36 15.94		Average Std.		

Legend of Table III-2

Agricultural	Description:
	(1) 95% of area for agriculture, government office, public facility, and environmental conservation (FAR 1:1 Residential development only for detached houses); (2) 90% of area for agriculture, residential, government office, public facility, and environmental conservation (FAR 2:1 Residential development that near university in 500m distance, Housing development for low-income by National Housing Authority)
Low Residential density	Objectives:
	(1) To conserve agricultural environment to water management and flood way; (2) To promote agricultural business in rural area
Medium Residential density	Description:
	(1) 90% of area for residential development, government office, and public facility (2) FAR 1:1 ~ 2.5:1 Detached house >40m <sup>2</sup> , Semi-detached house Townhouse, Shophouse (3) FAR 3:1 Residential building that H. >15m. Usage area 1,000 – 2,000 m <sup>2</sup> along > 10m. Width street
Commercial and Official	Objectives:
	(1) To support living environment in suburban area (2) To prepare for residential extension in suburban area (3) To maintain living environment between inner city and suburban area also surrounding sub-center, and transportation serviced area
Industrial	Description:
	(1) 90% of area for residential development (2) FAR 4:1~5:1 any type of residential unit, except over 23m. height /usage area over 10,000 m <sup>2</sup>
% (count)	Objectives:
	(1) to prepare for residential extension from inner city and sub-center (2) to support residential area connected commercial center in suburban and industrial area; (3) to support continued residential area from inner city in mass transportation serviced area
Land use*	Description:
	(1) 90% of area for commercial, residential (not for Detached houses and Semi-detached houses), government office, and public facility; (2) FAR 5:1, 7:1, 8:1, 10:1
Dens*	Objectives:
	(1) For sub-commercial center in sub-urban area, urban fringe; (2) For commercial business district
Settlement*	Description:
	(1) 90% of area for industrial estate and public facility; (2) FAR 2:1, 1.5:1, 1:1
WP	Objectives:
	(1) For industrial estate such as cargo, logistic center of South East Asian region
WD	Percentage of cell in each land use
	Land use definition as follow determination in land use comprehensive planning, Bangkok Administration <sup>11)</sup>
Z-score	Density of developed area in 1x1 km <sup>2</sup>
	Location of cells connected to road network
Grey cell	Areas are developed without planned
	Areas are planned but not developed
	Simple statistic to consider value with average range:
	Positive value = higher than average (H), Negative value = lower than average (L)
	Highest numbers of cell in row

### 3.6. Gated Housing Projects' Diffusion in sprawl classification

After we recognized four types in previous section, here we will investigate each type characteristic, especially a land composition and location of gated housing development in those compositions. As GHD has a special characteristic – fully closed with one gated –, composition and location are very important. Then, we will indicate their characteristics and source of different empirical situation of sprawling in terms of land use, land development, land configuration, townscape, and residential projects. According to various land use and difference in sprawl of each type, we consider: 1) high migration rate of population because it leads to high demand of housing development 2) largest area of land use in each type of sprawl, namely, low developed agricultural, low developed residential, highly developed medium residential, and highly developed low residential land use, are described as type A, B, C, and D.

#### **(1) Type A: New low development of agricultural area (further sprawl)**

According to the results in Table III-2, over a half of whole sprawl area is in type A. Moreover, around 90% of area has been developed since 2005, as newly development area. Main areas are conserved to do agricultural business; therefore almost all area is single land use and contains few numbers of housing developments by private sector. Supporting reasons about feasibility of GHD settlement in this area are 1) location of type A at a certain distance from city center and at perimeter of sprawl area with road network including arterial and collector street expanded cross over to connect beside city, and 2) Most land use is agricultural land that its density and living environment are controlled by law. Hence, developers cannot invest on new housing project within this area. However, this is still a sprawl area because there is a huge migration rate keeps moving into the vicinity area and low density of settlement still existed. Supposing that government remains inactive to prepare well-finished infrastructure and planning, some problems would take place in this area in the future. Therefore, it can be assumed that type A is further sprawl area. Figure III-7 shows few GHD distributed on agricultural land use, their gated face to local street. There are lacking of mixed land use and only inconvenient transportation exists for residents.

#### **(2) Type B: Supporting extension area with low to medium developed area (Initial sprawl area)**

Sprawl type B contains low density of development in various land use. Though, there are different land uses. They behave in similar way, namely, negative values of three indicators. This reflects the transition between Type A and Type C. The extent of Type B covers the second large number of whole sprawl area, also intervenes territorial of every type (Figure III-7). This type is connected with low developed area. Low density of residential development and GHD spread out widely across this. GHD project is with non-gated housing development. Some GHD has its location on local street and in such case there is no network to connect both parallel arterial located in mixture (Figure III-7).

Its GHD plot configuration in non-geometric form. Therefore, sprawl type B is as supportive area from highly developed area, which is surrounded. The situation of Type B is the beginning of sprawl, if there is a lack of well-finished planning and efficient infrastructure.

**(3) Type C: Previous high-developed area in medium-resident and commercial area (late stage of sprawl area)**

As shown in Figure III-6, location of sprawl Type C is attached with primary and minor arterial in the north and the south of BMR. The land use in this type is capable of development to urban area, including commercial-official, medium residential land use. In addition, the mixed land use is connected to main road as a node of area. The z-score graph in Figure III-7 obviously shows a large ribbon development area was expanded but there are few areas with inefficient infrastructure. The new GHD are combined with other non-residential, namely, industrial or commercial land use. However, in such situation, resident might face an environmental problem. This could be implied that type C has a capability to improve to an urban area.

**(4) Type D: Highly developed area but inefficient infrastructure (critical sprawl area)**

Highly development area in residential and non-residential is contained in this type, while there are still agricultural areas existed. Their characteristics conform to sprawl definition of BMR. Though, the areas were developed in previous period, but infrastructure has been not enough, as shown in graph of Figure III-7. Percentage of developed area without well-finished planning is higher than ribbon development area. Moreover, it also lacked of mixed land use but consisted of condense number of low density of residential area. It reflects critical sprawl problem for living environment, namely, an unbalance number of population to capacity of infrastructure or urban facility. Residential areas are still increasing because their locations are close to sprawl type C, an urbanized area, and also attached with arterial. This seems to be the perfect location for living, while it also motivates high demand of housing estate that leads to overwhelming of new housing development without enough planning. Highly developed agricultural land use is a good sample for replacing agricultural land with residential land. This was the impulse by road network. Currently, the areas are almost occupied completely by built-up area such as a low residential area; despite an agricultural land use. Another problematic area is a condense of highly developed area of low residential development located remotely from main road and behind ribbon development area. New housing project development occupied land along the road network without relationship to canal, where old local communities still located at the same place along to the canals with access by small local road. GHD also replaces paddy fields and orchards with free-form shape. Figure III-6 shows that GHD is likely to be gathered between main road and canal routes, which distributed in some streets used for an accessibility to road network by non-GHD settlements.



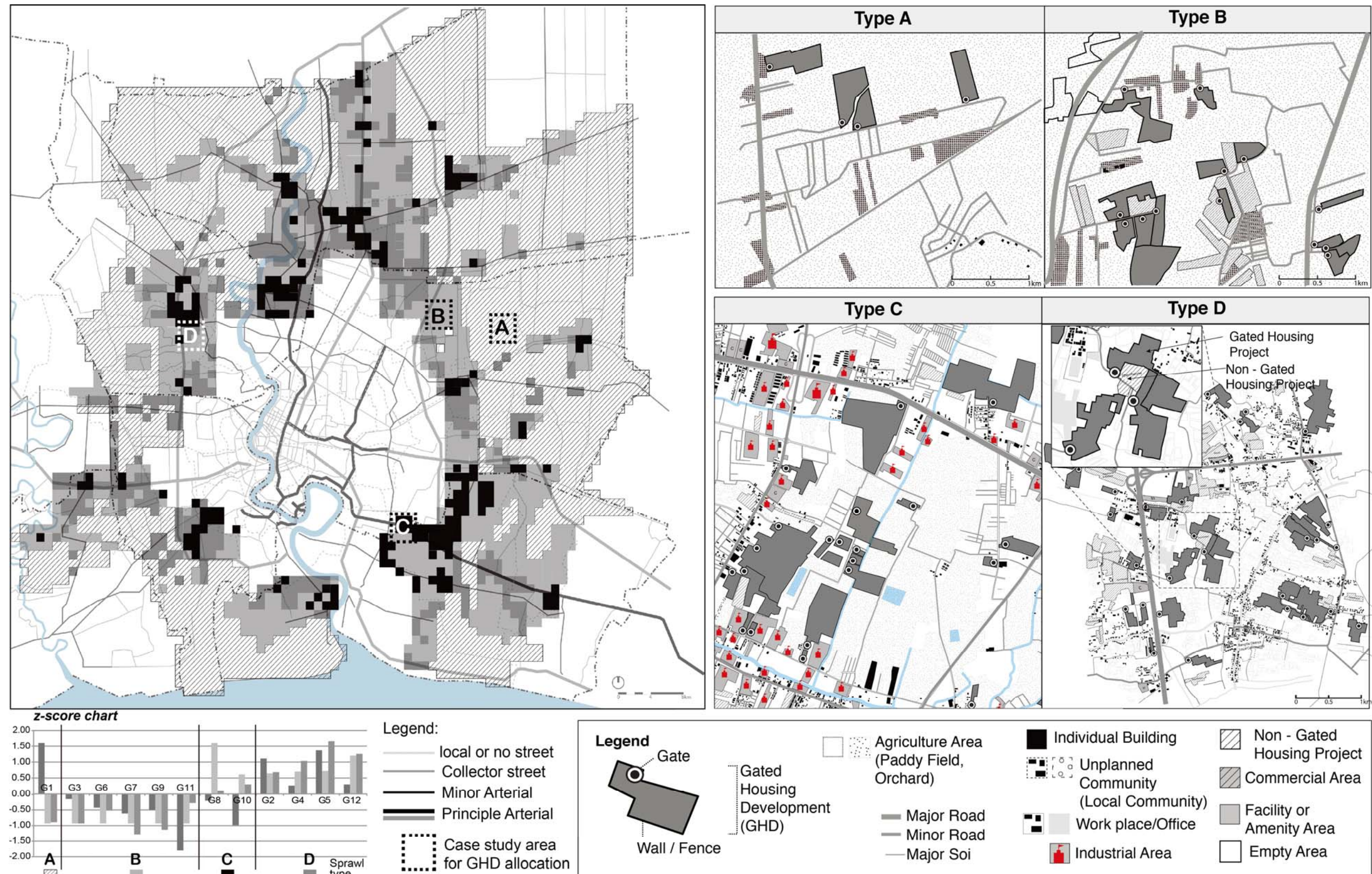


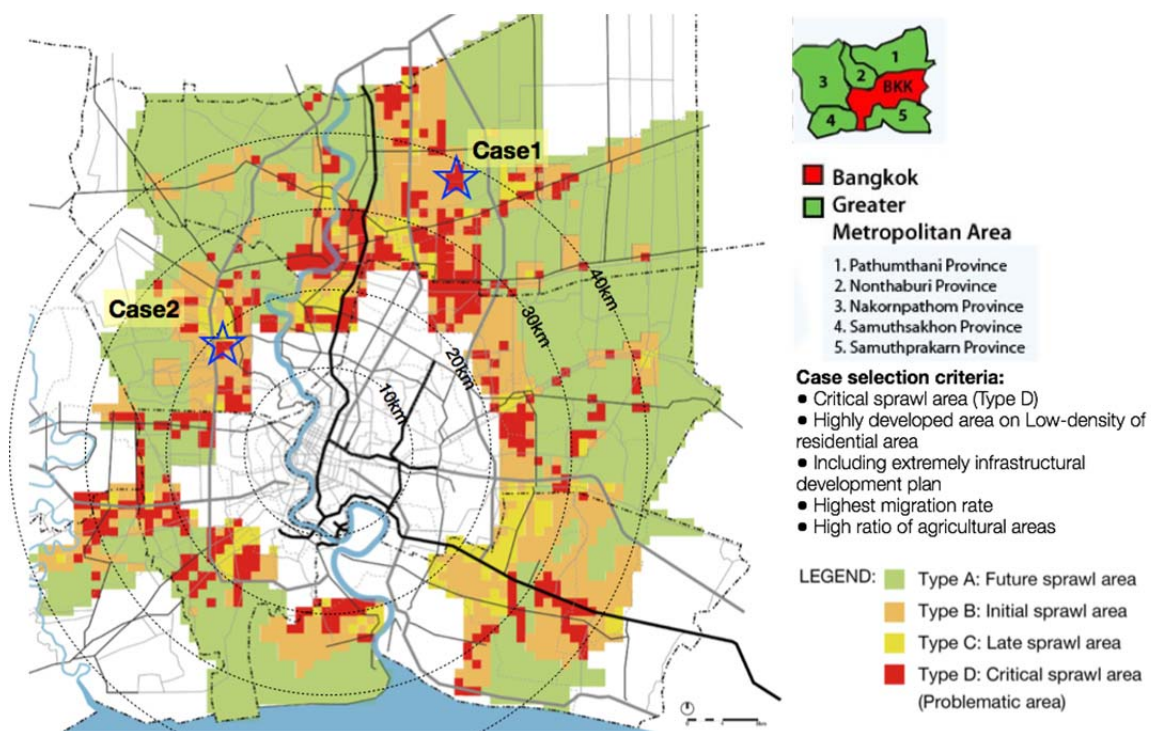
Figure III-7: 4 Types of sprawl and GHP's diffusion in sprawl classification

(Source: author, 2012)



### 3.7. Contribution for next Part of research: Case study area selection

According to results in Part I (Chapter III), the study reveals four stages of sprawl area in BMR focusing on GHP allocation. They lead us to know where is a problematic area with critical sprawl issue. In Figure III-8, most problematic areas locate in Pathumthani and Nonthaburi province (north of Bangkok city). When considered land use in both areas, they combine low-density of residential and agricultural land use. This situation is easy to make disturbing on agricultural land use from residential expansion. Meanwhile, another peripheral areas have more mixed land use. Generally, land use comprehensive plans are usually updated in Bangkok city but lack of improvement in vicinity areas.



**Figure III-8: Case study selection**

(Source: author, 2013)

Addition reasons to support case selection is policy in National economic and social development plan (1987) mentioned the extreme infrastructure development in vicinity area (Chapter II). The population growth in Pathumthani and Nonthaburi is dramatically increasing since 2004 as shown in Table III-3, at the same time, proportion of agricultural area are highest. Therefore, massive migration of people easily impacts on existing paddy fields and orchards of former villagers.

**Table III-3: Population growth in BMR**(Source: \*\*[http://stat.dopa.go.th/xstat/pop55\\_1.html](http://stat.dopa.go.th/xstat/pop55_1.html), \*Ministry of Agriculture and Cooperation, 1998)

Province in BMR	Area** (km <sup>2</sup> )	Population** (pp)		Density** (pp/km <sup>2</sup> )	Population Growth	Ratio* (1998) Agricultural/total area
		2004	2012			
Bagkok	1,568.737	5,6341,132	5,673,560	3,616.64	+0.7%	0.14
Nakhonpathom	2,168.327	789,016	874,616	403.36	+9.6%	0.51
Nonthaburi	622.303	942,292	1,141,673	1,834.59	+21.2%	0.22
Pathumthani	1,525.856	769,998	1,033,837	677.55	+34.3%	0.46
Samuthprakarn	1,004.092	1,049,416	1,223,302	1,218.32	+16.7%	0.09
Samuthsakhon	872.347	442,687	508,812	583.27	+14.9%	0.26
Total	7,761.662	9,636,541	10,455,800	1,347.11	+8.5%	

As reasons mentioned earlier, Pathumthani and Nonthaburi province are appropriately selected as case studies for effect evaluation of gated housing project development. However, both locations have to be examined in different chapter because the typology of area is totally different based on canal system. This situation is shown in map of BMR in Figure III-8 and Chapter II. Consequently, Pathumthani and Nontahburi area are investigated the evaluation of effects of gated housing projects in Chapter V and VI, respectively.

### 3.8. Findings and Conclusion

**Table III-4: Characteristic of different type of sprawl in BMR**

Type	Further sprawl area (Type A)	Initial sprawl area (Type B)	Late stage of sprawl (Type C)	Critical sprawl area (Type D)
Location	Perimeter sprawl area	Among high developed area	Along with arterial	Along and remote the arterial
Land use	Agricultural	Low-Residential Medium-Residential Commercial Industrial	Medium Residential Commercial	Agricultural Low-Residential Industrial
Density of development	Low	Low to Medium	High	High
Diversity of urbanized area	Low developed area	Low developed area	High developed area	High developed area
Decentralized	Non-Ribbon	Non-Ribbon	Ribbon	Ribbon
Period of Development	Newly development 2005~	Newly development 2005~ ~	Previously development Before 2005	Previously development Before 2005
Inefficiency infrastructure	Planned but not developed area	Planned but not developed area	Developed but not planned	Developed but not planned
Problems in area	Replacing agricultural area	Enclosing non-gated housing	Lack of well control mixed land use between residential and non-residential	1.Inadequate of infrastructure 2.Enclosing non- gated housing 3.Replacing agricultural area
GHD diffusion	Few numbers of GHD	Located on nonsystematic road network	Combined with other land use	Combined with former village and replacing agricultural
GHD problems	Inconvenient to travel to another land use beside agricultural	Inadequate of infrastructure, some street obtain too many projects	Environmental problems	Enclosed previous non-gated housing development



As mentioned above, Chapter III aims to classify sprawl area with specific factors of measurement for BMR context in order to determine GHP allocation in each type of sprawl.

#### (1) Characteristic of four types of sprawl classification

A finding in this chapter is nine factors of sprawl measurement as shown in Table III-1. After sprawl areas were categorized, we found four distinct types of sprawl situation locating on different locations and being different characteristics.

- Type A: New low development of agricultural area (Further sprawl)
- Type B: Supporting extension area with low to medium developed area (Initial sprawl)
- Type C: Previous high-developed area in medium-residential and commercial area (Late stage of sprawl area)
- Type D: Highly developed area but inefficient infrastructure (critical sprawl area)

According to Table III-4, characteristics of typology of land composition are related to different sprawl type. Classification of sprawl in this study could show type of sprawl area. Common pattern of development is a leapfrog that consists of small sub-center dispersedly in low residential land use. However, there are distinct background and unique qualification in each type, it is necessary to address specific problems that could occur by different characteristic. We can learn different density, amount, and gathering forms of GHD according to types of sprawl. Specially, according to the different land composition local community, road network, and traffic congestion that can find impact of GHD is in difficult way of accessibility.

#### (2) Primary effects in urban scale

The outcome of sprawl classification reveals comparison of effects among four types of sprawl area. As characteristic of each type is shown in Table III-3, the area that has the highest tendency of occurring problems is type D area. The order of sprawl area types from high to low problems is Type D > Type B > Type C > and Type A. At the same time, the age of sprawl area can be arranged from old to new area; Type C > Type D > Type B > and Type A. The location of effect evaluation in urban scale is shown in Figure III-8. This finding becomes a principal idea to select case study in this research.

#### (3) Case study selection

In this chapter, we also identify the representative areas of research to examine effect of GHP development. The study areas are selected in area of critical sprawl state. Nonthaburi and Pathumthani province are primary selections because both peripherals are locating in large areas of critical sprawl diffusion, reaching highest migration rate, and lacking of effective updated land use comprehensive plans. Moreover, most of the existing land uses are agricultural, thus, they are easily threaten by low-density residential land use, which could lead to social problems on residents.

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## PART 2

### **Effect Evaluation of social relationship and existing situation in district and community scale**

Part 2 aims to evaluate social relationship of inside and outside residents of gated housing project through multiple sources of evidence in district and community scale.

This part consists of three chapters as follows:

**Chapter IV** designs the assessment tools not only inside and outside neighborhood relationship but also physical observation and opinions of external stakeholders.

**Chapter V and Chapter VI** will focus on evaluation of effects of congested GHP development (Pathumthani) and disordered GHP development (Nonthaburi), as case study areas. The major evaluation is on social relationship. Characteristic of respondents, physical environment, and inside-outside neighborhood relationship are examined through multiple tools; observation, questionnaires, and interview. The end of chapters will reveal qualitative analysis about behavior of respondents and overall relationship.



### Evaluation of Neighborhood Relationship for inside and outside residents of Gated Housing Project Development

#### 4.1. Introduction

From findings in previous chapter, we can assume GHP allocation in the critical sprawl area is highly possible to affect on living of residents, particularly on social relationship. While social relationship inside community can empower strength and bond in community leading to self-sufficiency, the social relationship outside community can support municipal planning through creation of unification. Therefore, it is important to simultaneously assess inside and outside neighborhood relationship of GHPs and surrounding communities. This chapter tends to assess not only inside and outside neighborhood relationship, but also physical observation and opinions of external stakeholders. The framework of data collections and tools are as shown below (Figure IV-1);

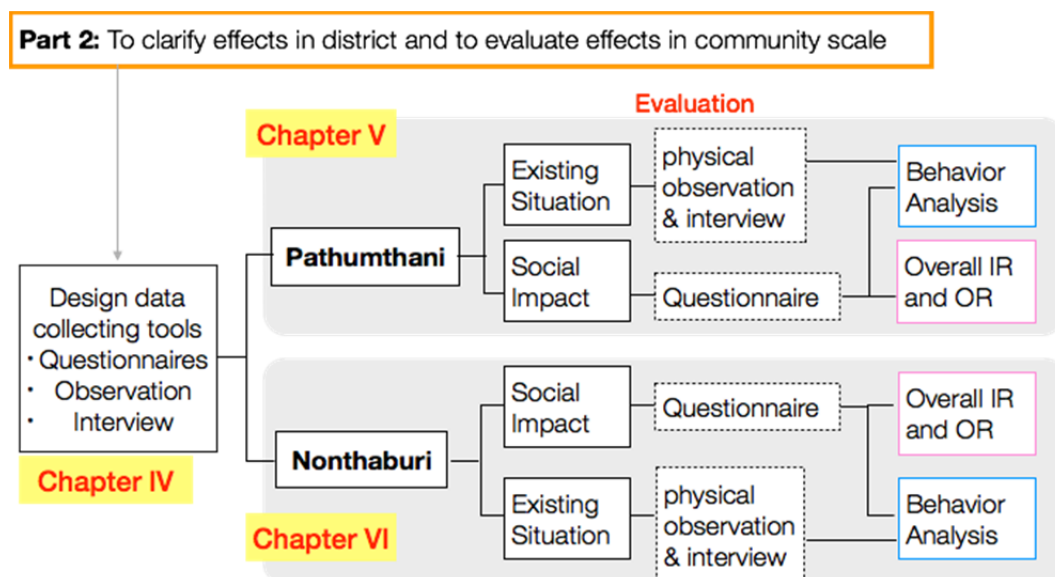


Figure IV-1: Data collection and tools

(Source: author, 2013)

After questionnaires were distributed, the received information from respondents is very important to organize instruction of analysis and synthesis following objectives of questionnaire. First, the general characteristics of respondents are revealed through descriptive analysis, such as, simple statistic in percentage and mean via SPSS program, we can understand the difference of opinions among five types of community. However, they are not enough to identify the important factors that should be suggested to promote inside and outside neighborhood relationship. Next, it is necessary to investigate 'factors' influencing on overall neighborhood relationship in study area as tendency analysis. We aggregate answers within five dimensions of inside - outside relationship into five scales of relationship; very low, low, average, high, very high, and set them as dependent variables. The independent factors are initially selected from previous researches about correlated factors on the sense of community and neighborhood relationship, followed by, physical environment, and background of respondents. Thirdly, the independent and dependent factors are calculated to clarify significant association through ANOVA and T-Test via SPSS program. At this stage, we can comprehend that 'some factors' influence on neighborhood relationship of respondents in different communities. The findings from evaluations; characteristic of respondents, inside-outside neighborhood relationship assessment, tendency analysis, and physical evidences, will be synthesized in each study area. These preliminary conclusions are discussed in Chapter VII to propose future recommendations.

## **4.2. Measurement of Neighborhood relationship in BMR**

The concept of social capital, like 'sense of community' applies to communities in both the geographic and relational sense, and should be considered distinct from individual characteristics.

Neighboring involvement is a social interactions, by which residents establish social connections that are either personal or at the neighborhood level. Coleman (1988) described a resident's organization in an urban housing project, which initially formed for the purpose of pressuring builders to fix various problems (leaks, crumbling sidewalk, etc). After the problems were solved, the organization remained as available social capital to improve the quality of life for residents. MacMillan and Chavis (1986) refined the construct of the concept of "physical sense of community" (Originally formulated by Sarason, 1974) including the following four separated dimensions:

- 1) Membership (MBS); the sense of feeling as part of a group, sense of belonging, sense of personal relatedness
- 2) Influence (IFE); a bidirectional concept that refers to the sense that the individual matters to the group, and that the group can influence its members, thereby, creating cohesiveness through community norms; a sense of mattering
- 3) Integration and fulfillment of needs (FON); the sense that members' needs will

be met by resources received through their membership in the group

- 4) Shared emotional connection (SEC); the sense of shared history in the community; the commitment and belief that members have shared common places, time together, and similar experience

In order to be more concrete assessment of the sense of community, it is important to appreciate the attributes in each dimension. The questions to measure 'Membership' should be asked about feeling that member has earned a place in a group, feeling of acceptance by the group, the consideration of member is more than emotional that protect group intimacy, and identification that can separate 'us' from 'them'. The questions in 'Influence' should be referred to both conformity and community influence on members indicates the strength of the bond. The inquiry of 'Integration and Fulfillment of Needs' supposes to examine whether they have similar needs, priorities, belief, and goals; their perception on success of community and capabilities of other members; serving satisfaction on their needs. The queries in 'Shared Emotional Connection' aspire to check on frequency of contact, quality of interaction, the importance to the member of the community's history and current status, and community bond. As literature review, the sense of community is one of indicators to assess social interaction. It can reflect quality of physical environment. The neighborhood is an appropriate context for studying human behavior and social action (Sawicki, et al., 1996). That is a reason why the questionnaires for inside-relationship assessment were applied for the sense of community measurement to assess neighborhood relationship with evaluation of respondent and neighbor, and respondent and inside-community. Particularly in BMR context, modern housing development has to set legal committee in order to self-maintain common amenities and environment within community, as housing act and regulation. Therefore the inside-neighborhood relationship assessment is an important tool to evaluate and revise community design that may encourage unification in municipal scale.

The source of idea about outside-neighborhood relationship assessment is the problems of non-cooperation from inhabitants in municipality that it is necessary for making public hearing by local government. It is difficult to achieve the effective local urban planning and to determine visions in order to response demand of people. Thus, outside relationship or outside behavior study is conducted by; 1) outside activities you did in daily life, 2) motivation you attended occasionally outside event, 3) physical elements of GHP make you feel segregation, and 4) perception on surrounding or outside community. Those given activities based on possible actions that respondent can ordinary do in everyday life. Moreover, the idea of motivators, which attracts respondents to go out their communities to public area, is applied from a notion; the more important the shared event is to those involved, the greater community bond (McMillan and George, 1986). While the influenced physical elements of GHP are directly applied from research objectives that need to investigate effects of GHP. The questions



are shown in section 4.3.2.

Questionnaire aims to expose different neighborhood relationship, and to compare inside and outside relationship among five types of community. The outcome will be displayed in tables and bar charts by percentage of chosen answers (Chapter V and VI). To understand study area and GHP situation, physical observation results are described in beginning of Chapter V and VI. Then, relevant stakeholders as developers and local government officers will be clarified in Chapter VI before concluding the overall results in Chapter VII.

### 4.3. Research design and Data collecting tools

Research population can be calculated with Taro Yamane's formula or table as follow;

Where  $n$  = Sample size

$N$  = Population size

$$n = \frac{N}{1 + Ne^2}$$

$e$  = Sampling error (usually .10, .05 and .01 acceptable error)

According to the formula, the sample size is 400 people, when sampling error is 0.05 and population is 126,562 people in Bangyai district, Nonthaburi province. The questionnaires were randomly distributed to five types of community within study area under these conditions; 1) residents who live inside a gated housing project in both detached houses and townhouses; 2) inhabitants who live outside a gated housing project such as former villages. The questionnaires were distributed by face-to-face acquirement during March 12-14, 2013. The distribution is limited by restriction and regulation of private property; hence, number of respondents is possibly lower than expected. The research results were conducted by social assessment that included three tools of data collecting. Firstly, physical environment of five types of community was observed through taking photograph and taking note in order to know existing situation.

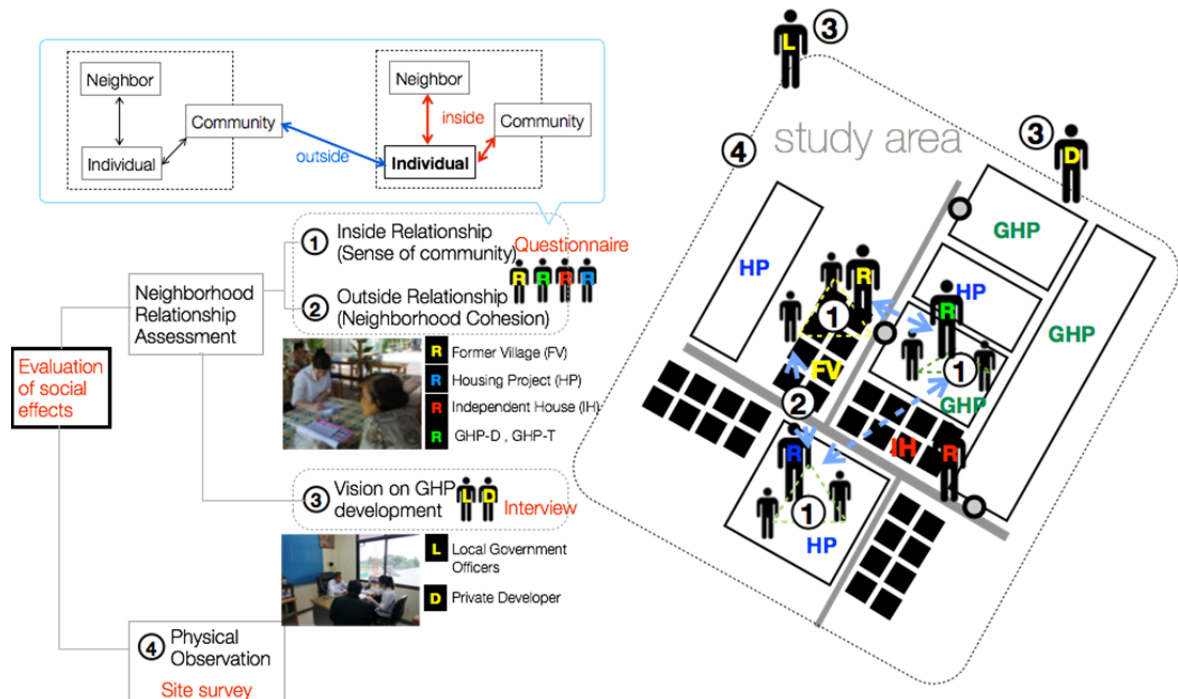
Next, 400 questionnaires were distributed randomly to five types of community in study area that is found during overall site survey. Respondents were asked to indicated their agreement, satisfaction, perception, frequency, and number of activity participation with nine statements referring to "their own neighborhood and community, and surrounding community". The statements in questionnaires were composed as closed-ended question and rating scale, which are shown in Table IV-1, and applied from literature review in section 4.4.

The five types of communities, which are existed in case study areas, are categorized by noticeable physical elements as shown in Table IV-1. They are found in both case studies.

**Table IV-1: Categories of five types of communities**

Type	Development	Period	Access	Type of house	Boundary of community	Community management
FV (Former Village)	Unplanned	Old	No controlled	Detached house	Unclear	Non-official meeting (by local government)
GHP-D (Gated Housing Project with Detached house)	Planned (by developers)	New	Controlled	Detached house	Clear (Concrete wall)	Official meeting (by residents)
GHP-T (Gated Housing Project with Townhouse)	Planned (by developers)	New	Controlled	Townhouse	Clear (Concrete wall)	Official meeting (by residents)
HP (Housing Project without controlled gate)	Planned (by developers)	Old	No controlled	Detached house/ Townhouse	Clear (Concrete wall)	Non-official meeting (by local government)
IH (Individual House)	Unplanned	New	No controlled	Detached house/ Townhouse	Unclear	Non-official meeting (by local government)

Thirdly, the structural interviews were used to perceive macro perspective from relevant stakeholders, such as, developers and local government officers. Their aspects are important to know consideration gap about social interaction in community as responsible person. The concept of evaluation method is shown in Figure IV-2.



**Figure IV-2: Concept of evaluation of social effect**

Next, 400 questionnaires were distributed randomly to five types of community in study area that is found during overall site survey. Respondents were asked to indicated their agreement, satisfaction, perception, frequency, and number of activity participation with nine statements referring to “their own neighborhood and community, and surrounding community”. The statements in questionnaires were composed as closed-ended question and rating scale, which are shown in Table IV-2, and applied from literature review in section 4.4.

#### **4.3.1. Physical Environment Observation**

According to several researches about social relationship, neighborhood study, or even urban planning, has similar arguments that physical environment is a highly influenced factor on social interaction of citizen. It affirms that environmental variables affect frequency and quality of social contacts, and that creates group formation and social support. Buckner (1988) revealed that the physical attractiveness of the neighborhood could be strengthening social cohesion. Because the sense of community in a neighborhood is spatially defined, a well-defined boundary contributes to the connection to particular place and the sense of community therein. Next decade, new urban designers attempt to build the sense of community, broadly defined, through: integrating private residential space with surrounding public space, and careful design and placement public space (Talen, 1999). Talen’s work also concluded the design elements used to promote the sense of community from other works during 1991 - 1994; architecture and site design, density and scale, street, public space, and mixed land use. Up to now, the criticism on association of physical environment and social cohesion in neighborhood scale is a debatable issue. The generally shared outcome is the physical designs make a difference in the sense of community (Rogers and Sukolratanamettee, 2009) but seem significant modification of social relationship depends on context of study. These notions conduct the research question and become basic principles of physical observation in this study, in the fact that there are added on points rising through empirical survey. We found different types of community according to type and style of residence that will be explained more in Chapter V and VI.

To achieve the aim of research, the physical observation proposes to inclusively appreciate existing circumstance of study area, especially on GHP’s allocation. Proceeding results from Chapter III, we can realize the total situation in four states of sprawl and their overall characteristics. The effect of GHP can be evaluated through physical observation at the beginning of Chapter V and VI before distributing questionnaires. The principals of observation are inside atmosphere of communities and surrounding circumstance in sub-district scale. This section will expose the distinctive physical environment among different types of community to be used as an independent variable on neighborhood relationship, and supportive evidences to explain outcomes of research.

### 4.3.2. Questionnaires

Structure of questionnaires (Figure IV-3) for residents and inhabitants based on the sense of community and neighborhood cohesion measurement includes; membership, influence, interaction, shared emotional connection, and perception on outside relationship. The objectives of questionnaire;

- 1) To understand background of respondents in five types of community
- 2) To assess 'social effects' of inside neighborhood relationship (IR) and outside neighborhood relationship (OR), including sense of community and neighborhood cohesion concept
- 3) To clarify 'influenced factors' on neighborhood relationship towards possible suggestion for future GHP development
- 4) To explore 'behavior' of respondents that can explain results of IR and OR in five types of community

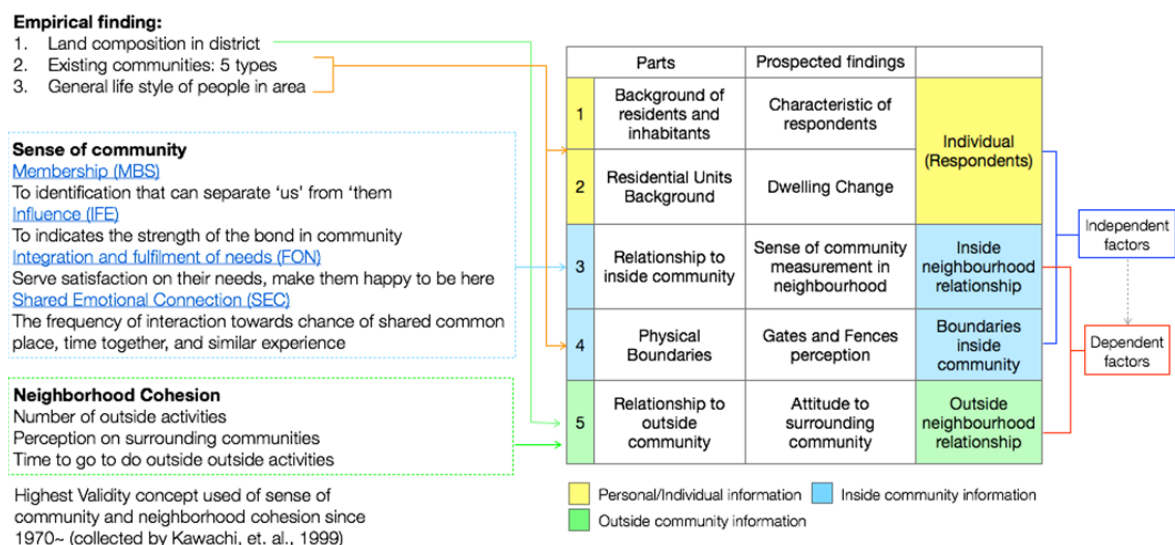


Figure IV-3: Structure of questionnaire

**Table IV-2: Interpretation of Questions of neighborhood relationship measurement in questionnaires in Part 1-2**

(Source; author, 2012)

Questions	Choices		Objectives
Community type	(1) Former Villager (2) Gated Housing Project (Detached House) (3) Gated Housing Project (Townhouse)	(4) Housing Project without gate (5) Individual House	
PART 1: Background of residents and inhabitants			To understand background of respondents in five types of community
1.1 Age	... years		
1.2 Status	(1) Single (2) Married	(3) Widow	
1.3 Family member in this house	... persons		
1.4 Your occupation	(1) Government Staff (2) Staff in private company (3) Business Owner	(4) Shopkeeper (5) Freelance (6) Unemployed	
1.5 Workplace	(1) Bangkok city (2) Vicinity	(3) At home (4) Unemployed	
Travel time to work	... minutes		
1.6 Approximate family’s income	(1) Under 10,000 THB. (2) 10,001 – 30,000 THB. (3) 30,001 – 50,000 THB.	(4) 50,001 – 70,000 THB. (5) Over 70,001 THB.	
PART 2: Residential Background			
2.1 Residential ownership	(1) Owner (2) Dweller	(3) Tennant	
2.2 Period of dwelling	... years		
2.3 Type of previous dwelling unit	(1) Detached House (2) Townhouse (3) Apartment or Condominium	(4) Shophouse (5) Semi-detached house (6) Here is my first house	

2.4 Reason for moving in (can choose more than one)	(1) Near workplace (2) Affordable price (3) Good design and material (4) Proper size for family (5) Credible housing developer (6) Good Facility inside project/community (7) Good Facility outside project/community	(8) Lively community (9) Near public facility (hospital, school,...) (10) Birthplace (11) Used to be farmer (12) Family moved in (13) Other	
2.5 Purpose of buying or dwelling	(1) For living (2) For Business	(3) For living and business	
Questions	Choices	Interpretation	Objectives
<b>PART 3: Relationship inside community</b>			
<b>3.1 Community Perception</b> Your perception on public area in community	(1) When public space get dirt, you would like to take responsibility even you didn't make (2) You would like to be a part of community committee (3) Your neighbor is as your friend (4) You feel up this community is as your home	3.1. To examine sense of feeling as part of group within community (1)'Cleaning in common area' shows they concern about environment (2)'Community committee' shows respondents want to take care whole community (3) 'As your friends' reflects neighbors become a part of their group (4) 'As your home' is including neighbors and environment within community, and feel safe	(2)
<b>3.2 Community Participation</b> 3.2.1) Type of activity/event that you often attend in your community (can choose more than one)	(1) Community meeting (2) Festival (Annual/Religious) (3) Sport (4) Voluntary (5) Never attend (6) Other	3.2 To investigate what activity can promote opportunity of social contact. The choices are generated from typical events in general Thai communities. (1) This meeting is a determined system in residential regulation for GHP (2) Religious event includes Buddhism, Muslim, and Christian. (3) Sport is general activity that easily held in wherever inside community (4) Voluntary can reflect the sacrifice (5) Never participation can show high isolation	(4)

3.2.2) You prefer to participate with whom?	(1) Only your community (2) Between inside and outside member (3) Between inside member and local government (4) Not specific, anybody can join	3.2.2 To examine the closeness of community via variety of participants in the same activity (1) reflects 'Closed community' (2) reflects 'Semi-Closed community' because other citizen also live in the same district (3) reflects 'Semi-Opened community' because local governmental officers have low familiarity to residents inside community (4) reflects 'Opened community'	(2)
<b>3.3 Influence of each other in your community</b>	(1) Take advice from neighbor when you faced problem (2) I am important for community (3) You concern with neighbor's thinking (4) Any Change in community effects on feeling (5) I think community leader is reliable/trustable	Because 'influence' is bidirectional concept, it consists of; member to be attracted to a group, and a group's ability to influence its member. Thus the questions refer to those sides of influence. (1) a group to influences member (respondent) (2) member to be attracted to a group (3) a group to influences member (respondent) (4) a group to influences member (respondent) (5) member to be attracted to a group Therefore, the measurement of 'influence' is cohesiveness of answers.	
<b>3.4 Community Value</b> 3.4.1) Your community can solve problem by themselves	(1) Yes (2) No	Reinforcement and need fulfillment is a primary function of a strong community. The effective reinforcers of communities are status of membership, success of the community, and competence of capabilities of other member. (3.4.1) represents how respondents feel on success of community.	
3.4.2) Community perception (can choose more than one)	(1) Safe (2) Friendly neighbors (3) Lively community (4) Bad Perception	The overall perception on inside community including; neighborhood, environment, and housing unit, shows what level of their feeling as follow; (1) 'safe' is as highest basic needs of residents, (2) 'friendly neighbors' is a perception on neighbors in a cluster or smaller group, (3) 'lively community' is a perception that relies on overall state of community, and (4) 'bad perception' is negative perception.	

<b>3.5 Satisfaction and Feeling</b>			
3.5.1) Environmental satisfaction	(1) Very Low (2) Low	An effective reinforcer of community; satisfaction can fulfill the basic needs	
3.5.2) Degree of trust to neighbor	(3) Neutral (4) High	An effective reinforcer of community; trust can fulfill the basic needs	
3.5.3) Feeling when someone support your community	(5) Very High	'Your feeling when community is improved' represent how respondents feel on success of community.	
3.5.4) Best thing for community as yours	(1) Yes (2) No	Represents how respondents feel on success of community.	
3.5.5) Do you face any problems in community?	(1) Yes (2) No	Set to check current status of living of respondents that they face any problems	(4)
3.5.6) If so, what is it?	...		
<b>3.6 Neighborhood Interaction</b>			
3.6.1) Number of acquaintance in your community	(1) 0-5 persons (2) 6-10 persons (3) 11-15 persons (4) over 15 persons	The interactions of members in shared events may facilitate or inhabit the strength of the community. That is why series of questions in this factor aim to measure quality of interactions of members. (3.6.1) Number of acquaintance inside community reflects chances of encounters (2) shows the way they met	(2)
How do you know them (can choose more than one)	(1) Being neighbors/nearby house (2) Participate event/activity (meeting/exercise..) (3) Greeting/chatting/Visiting in daily life (4) Doing business/working/ (5) Being friends/relatives/known before		(4)
3.6.2) Number of friends in your community	(1) 0-5 persons (2) 6-10 persons (3) 11-15 persons (4) over 15 persons	More friends in community can make members are willing to join event or share event	(2)
3.6.3) Number of trustable family	... households		
3.6.4) You please to support	... households	Reflect kindness on community	



3.6.5) How often do neighbors visit your place	(1) Never (2) Once a month (3) Once a week (4) Twice a week (5) Almost everyday	The more people interact, the more likely they are become close. This notion generate question 4.1(4) and 4.1(5). 4.1(4) shows frequency of face-to-face encounters by neighbors' approach
3.6.6) How often do you talk to neighbors	(1) Never (2) Once a month (3) Once a week (4) Twice a week (5) Almost everyday	4.1(5) presents frequency of face-to-face encounters and activeness of respondents to interact with neighbors
<b>Community Bond</b> 3.6.7) You tie up with community	(1) Neighbor is very important for living (2) I like my neighbor (3) I am proud to live here (4) I feel sad if I have to move out	The importance of the member of the community's history and current status is determined as the attachment to community. The measurement is considered from; (1) and (2) refer interpersonal emotional risk one takes with the other members; (3) and (4) reflect the extent to which one opens oneself to emotional pain from the community life. The number of chosen answers shows degree of community bond.
3.6.8) Interdependence in community	(1) Yes (2) No	Refers people can depend on each other/willing to help within community. This is one of interpersonal emotional with other members.

#### PART 4: Boundary perception

4.1 Do you perceive that you have "fence" as community boundary?	(1) Yes (2) No		
4.2 Existing fence	(1) Yes (2) No		
4.3 Do you perceive that you have "gate" with guard in community?	(1) Yes (2) No		
4.4 Existing gate	(1) Yes (2) No		

#### PART 5: Relationship to outside community

5.1 Perception to surrounding community	(1) Feel bad (2) Neutral (3) Feel good	The overall perception on outside community including; surrounding neighborhood, community, environment	(2)
5.2 Outside activity in daily life (can choose more than one)	(1) Buying food at market (2) Shopping at department store (3) Religious activity at temple	1. Number of outside activity reflects possibility to make outside social interaction 2. Physical elements that affect on residents' perception	(4)

	(4) Participate public event (5) Working/Going to school (6) Using public facility (7) Using local service; salon, shops, ...	3. Illustration of unity in study area	
Travel time to do that activity	... minutes	The more activities that respondents attend, the more opportunities of social interaction they have	
Average number of outside activities	... activities		(2)
Marking those activities' location	Draw in map in questionnaires		
5.3 Motivation to join outside event with outside community (can choose more than one)	(1) Facing public problems or crisis (2) I always concern surrounding community (3) Interesting activity (4) Other	The more important the shared event is to those involved, the greater the community bond. For example, there appears bonding among people who experience a crisis together. Hence, this question was asked. (1) is supposed as crisis experience (2) the motivation comes from personal interest not attributes of activity (3) is assumed as positive experience (4) other reasons	(4)
5.4 Physical Design effect on social segregation	(1) High fence of community boundary (2) Gate of community (3) Facility inside community (4) Design of dwelling unit; type, color, material (5) No effect	This question reflects what elements of GHP that influence on feeling of social isolation. The choices are designated follow the remarkable elements; fences, gates, inside amenities, and style of housing units. The last choice is 'no effect' that means all those elements have no influence on social isolation.	(4)



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Kyoto University Graduate School of Engineering  
Department of Architecture and Architectural Engineering

Notification

This questionnaire is a part of dissertation in title, "Effect Evaluation of Gated Housing Project Accumulated in suburban residential area of Bangkok Metropolitan Region, Thailand", produced by Ms. Siwaporn Klinmalai who is 3rd year doctoral student in Department of Architecture and Architectural Engineering, Graduate School of Engineering, Kyoto University, Japan.

This aims to survey attitude from developers in terms of effect of gated community development on social interaction and community development

Part 1: Background of residents and inhabitants

Part 2: Residential unit background

Part 3: Relationship inside community

Part 4: Relationship to outside community

All of answers will be kept in confident information and used for this research only.

Thank you very much for your kindly attention.

Ms. Siwaporn Klinmalai

**STAFF'S PART**

Character of community

- ( ) Local community, named.....
- ( ) Gated Housing project, Detached housing project with fence and controlled gate, named.....
- ( ) Gated Housing project, Townhouse project with fence and controlled gate, named.....
- ( ) Non – Gated Housing project, housing project without controlled gate but fence, named.....
- ( ) Individual House

**Part 1. Background of residents and inhabitants**

1.1 Age.....yrs

Your role in community ( ) Leader ( ) Committee ( ) Member

1.2 Social Status

( ) Single ( ) Married ( ) Widow

1.3 Family member (who live in this house) ..... person(s)

1.4 Occupation

- ( ) an government staff ( ) shopkeeper
- ( ) a staff in company ( ) freelance.....
- ( ) business owner..... ( ) other.....

1.5 Work place

- ( ) In Bangkok City travel time.....mins
- ( ) In Vicinity travel time.....mins
- ( ) Work at home ( ) Unemployee

1.6 Approximate family's income

- ( ) under 10,000 THB ( ) 30,001 – 50,000 THB
- ( ) 10,001 – 30,000 THB ( ) 50,001 – 70,000 THB
- ( ) over 70,000 THB

Figure IV-4: Questionnaire Sheet page 1

**2. Residential unit background**

2.1 Residential Ownership

☐ Owner ☐ Dweller ☐ Tenant

2.2 Period of dwelling ..... yrs

2.3 Type of previous dwelling unit

☐ Detached House ☐ Apartment ☐ Semi-detached house  
☐ Townhouse ☐ Shophouse

2.4 Reason for moving in

☐ Near workplace ☐ Affordable price  
☐ Good design and material ☐ Proper size for family  
☐ Credible housing developer  
☐ Good facility "inside" project or community  
☐ Good environment "outside" project or community  
☐ Lively community  
☐ Near public facilities; hospital, school,...  
☐ Birthplace ☐ Used to be farmer who lived here  
☐ Family moved in ☐ Other .....

2.5 Purpose of buying or dwelling

☐ For living ☐ For business ☐ Both of these

**3. Relationship inside community**

3.1 Membership perception (Can choose more than one)

☐ When public space get dirt, you would like to take responsibility even you didn't make.  
☐ You would like to be a part of community committee  
☐ Your neighbor is like as your friend  
☐ You feel up this community is as your home

3.2 Community Participation

3.2.1 Type of activity or event that you oftenly attend with member in your community

☐ Community meeting ☐ Annual festival / Religious festival  
☐ Sport event ☐ Volunteer  
☐ Never attend ☐ Other.....

3.2.2 Which kind of event that make you want to attend or join

☐ Event that open for your community  
☐ Event that was organized between inside members and outside members  
☐ Event that was organized between inside members and local government  
☐ Not specific, anybody can join

3.3 Influence of each other in your community

1) Take advice from neighbor when you faced a problem ☐ Yes ☐ No  
2) Feel up I am important for community ☐ Yes ☐ No  
3) You concern with neighbor's thinking ☐ Yes ☐ No  
4) Any change in community effects on your feeling ☐ Yes ☐ No  
5) I think community leader is reliable / trustable ☐ Yes ☐ No

**Figure IV-5: Questionnaire Sheet page 2**

## Questionnaire Sheet

### 3.4 Community Value

3.4.1 Do you think your community can address problem by themselves?

( ) Yes ( ) No

3.4.2 Community perception

( ) Safe ( ) Friendly neighbors ( ) Lively

( ) Bad perception ( ) Other .....

### 3.5 Environmental Satisfaction

Questions	Sastisfaction				
	Very Low	Low	Neutruai	High	Very high
Do you satisfy about current environment?					
Degree of trust to neighbor					
How do you feel when someone is please to help or develop your community?					
Do you feel that best thing for community is as for you?	( ) Yes			( ) No	
Do you have any problems in community?	( ) Yes			( ) No	
If yes, what is it?					

### 3.6 Shared Emotional Connection

3.6.1 How many people you know and can remind their name in your community?

( ) 0 – 5 people ( ) 6 – 10 people ( ) 11 – 15 people ( ) 15 people plus

How do you know them.....

3.6.2 How many friends in your community?

( ) 0 – 5 people ( ) 6 – 10 people ( ) 11 – 15 people ( ) 15 people plus

3.6.3 Number of trustable family.....households

3.6.4 How many families you would like to support anytime they got problem .....households

3.6.5 How often do neighbors visit your house?

( ) almost everyday ( ) twice a week ( ) once a week ( ) once a month ( ) Never

3.6.6 How often do you talk to neighbor?

( ) almost everyday ( ) twice a week ( ) once a week ( ) once a month ( ) Never

3.6.7 You tie up with community (community bond)

( ) Neighbor is very necessary for living ( ) I like my neighbor

( ) I am proud to live here ( ) I feel sad if I have to move out

3.6.8 Interdependence in community

( ) Yes ( ) No

### 4. Community Characteristic

4.1 Do you have "wall" as your community boundary?

( ) Yes ( ) No

4.2 Does that "wall" still exist?

( ) Yes ( ) No

If yes, why don't you still keep "the wall" .....

4.3 Do you have "gate" with security guard in your community?

( ) Yes ( ) No

4.4 Does that "gate" still exist?

( ) Yes ( ) No

If not, why do you stop the gate? .....

Figure IV-6: Questionnaire Sheet page 3



Questionnaire Sheet

5.1 Perception to surrounding community

( ) Feel Good, Why?.....

( ) Neutral

( ) Feel Bad, Why?.....

5.3 Motivation to attend outside activity

( ) When we face to public problem      ( ) I always concern surrounding

( ) Interesting acitivity      ( ) Other .....

5.4 Do you think physical design can effect on social segregation?

1) the high wall or fences	( ) Yes	( ) No
2) the gate of community	( ) Yes	( ) No
3) facility in community	( ) Yes	( ) No
4) material and color	( ) Yes	( ) No
5) No effect		

---

Thank you for your cooperation

**Figure IV-8: Questionnaire Sheet page 5**

#### **4.3.3. Structural Interview**

The aim of interview is to explore visions of external relevant stakeholders who not belong to study area. They are private developers, owners of housing projects, and local government officers who are in charge to develop public infrastructure and establish local urban planning in municipal scale. Each question is asked for different objectives as shown in Table IV-3 and IV-4.

**Table IV-3: Structure of interview and interpretation for Developers**

	Question's points	Objectives
Part 1: Overall information of your company include target groups and projects	1) Typical process for housing development of your organization	Aim to check single process of housing development that concerned about social impact or not
	2) What is your organization products' signature and characteristic	Townhouses and detached – houses project
	3) What is your target group for low-rise housing development? Where are their locations	To know market position of company in housing market and criteria for setting location
Part 2: Attitude and opinion about effect of housing projects developed local communities in terms quality of community and social interaction	1) Do you concern social impact on community inside project and local community as follow up plan? If so, how	How important of social impact to project initiation
	2) Do you design lay out, landscape, and residential architecture inside the project to promote and improve community interaction of inside and outside project? If so, how?	Aim to examine their idea about physical design to improve interaction and quality of community
	3) In terms of business, idea about good community development and public mind through physical design can be feasible to make profit or value adding for company or not? How it is possible? Please share your perspective both positive and negative.	Aims to know their opinion about community design in business terms
	4) How do you think that the projects, which promote good quality of community, can be selling point and interesting point for buyers? (Marketing)	To know possibility of adding community development concept in private housing project
	5) Could you please give me sample projects in your company that can support social interaction in community and also a project that impact to local community or urban context?	Aims to know their solution for community design both success cases and trouble cases
Part 3: Attitude and vision on housing development change in the future	1) What is reason that you developed housing projects as gated community development (with gate, high fence, and controllable access, so on)? And how did they change from the first developed project?	To know history of gated community development in the firm
	2) What your aspect about social concern, particularly public concern and local community, can increase or decrease your margin? And please suggest the solutions?	To know their solutions how to combine community design or social development into real estate business
	3) What is your vision for low – rise housing development's trend of your organization?	To forecast trend of housing development in the future

**Table IV-4: Structure of interview and interpretation for Local Governmental Officers**

	Question's points	Objectives
Part 1. Overall Background of community in municipality	1) Type of community in municipality 2) Population census, social, and economic 3) Example of activity for community improvement and operation	Community characteristic
Part 2 Attitude and opinion about impact of housing development on community improvement and also relationship both inside and outside community	1) Relationship between residents in housing development and inhabitants in local area 2) There are public participation to address public problems 3) Role of the ceremony development office 4) Sample research about community development 5) In your opinion on physical environmental design	Point of view from local government about impact of housing development and its impact
Part 3 Vision to community development in the future	1) Achievement of community development and obstacles 2) Direction of community development in the future plan 3) Factors for create well community	Direction of community development in the future



The interviewees are developers, developed housing projects that are samples of research. Local government officers are selected as people in charge of study area. However, there is limitation of time and permission, thus number of interviewee depends on availability during period of survey. We have questions to 2 local governmental officers and 2 developers. After the inquiry, their opinions and vision will be examined as descriptive analysis in Chapter V and VI.

#### **4.4. Findings and Conclusion**

According to the objective of this chapter to create reliable method of neighborhood relationship assessment for BMR context, we design individual composite tools including; physical observation, structural questionnaire, and structural interview. This idea about combination of sources of evidence regards to concept of effect evaluation that needs multiple perspectives to analyze the results (Chapter I).

Questionnaire is used as a main evaluator of social effects from gated housing projects. The composition of questions based on sense of community and neighborhood cohesion concept through literature review, at the same time, they are added inquiries to investigation current living situation and behavior to outside community of respondents. The questions are show in Table IV-1. To create reliable results, 400 questionnaires are required in each case study and obtained through face-to-face questions. However, the collected questionnaires also depend on cooperation of respondents. Some areas have high security and privacy, thus the total number of gathered questionnaires may not reach the expectation.

The structure of questionnaires is conducted to five parts as follow;

(1) Part 1: background of respondents

To investigate characteristic of respondents in different type of communities, the questions about basic information are asked.

(2) Part 2: background of previous residence of respondents

This part aims to examine opinion and interest of respondents about reasons to choose residences and their expansion.

(3) Part 3: Inside neighborhood relationship

This section combines concept of sense of community and neighborhood cohesion. The questions try to evaluate neighborhood relationship inside each community type.

(4) Part 4: Existing physical environment in community

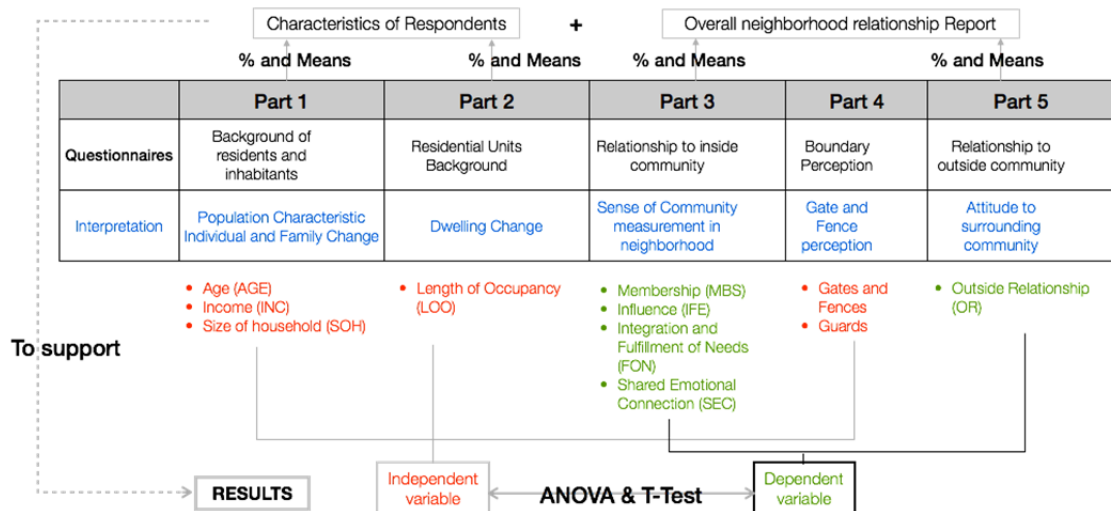
Besides physical observation is applied during site survey by author, perception of respondents on their community environment also required in term of respondents' side.

(5) Part 5: Outside neighborhood relationship (OR)

Concept of evaluation of this section bases on opportunity of social interaction

outside community. Number of outside activities is asked to assess the chances. Perception of respondents on surrounding communities is directly evaluated to estimate their feeling.

Results from each part of questionnaires will be analyzed and explored as follows;



**Figure IV-9: Structure of questionnaire and results reporting**

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## **CHAPTER V**

### **Neighborhood relationship assessment in Residential area with congested GHP settlement in Pathumthani province**

#### **5.1. Introduction**

This chapter focuses on evaluation of effects of congested GHP development, especially neighborhood relationship. As mentioned in previous chapter, Pathumthani is a peripheral area with the largest critical sprawl areas occupied. After we found crisis area and driven factor of sprawl phenomena in BMR, most areas are located on low residential and agricultural land use, and consisted of high density of GHP adjacently. It easily impacts on the way of life of residents. Therefore, we selected Khlongluang district as one of study areas, which congested GHP settlement, and in need to be examined in term of neighborhood relationship evaluation. This measurement includes not only relationship among inside residents, but perception on outside communities is also concerned. To fully understand results from relationship assessment, perspective of stakeholders and physical observation should be integrated.

Thus, the following two parts conduct Chapter V; firstly, physical observation is used to understand overall existing situation. Secondly, to clarify neighborhood relationship inside and outside of gated housing project, we thoroughly observe physical environment of community, distribute questionnaires by face-to-face acquirement, and interview municipality officers and developers based on literature review. Additionally, we also inquire a non-structural interview to residents during observation to support statistic results. In summary, all results are analyzed as neighborhood assessment with supportive opinions from stakeholders, especially, from gated housing development influenced neighborhood assessment affect.

## 5.2. General overview of Khlongluang district, Pathumthani province

Beside Pathumthani has the highest population growth<sup>1</sup>, its land use is combined between residential and agricultural area (Figure V-1(C)). According to history of area, the eastern side was a part of drilling canal project (Figure V-1(D)) for agricultural activity since King Rama V era (1868 – 1910). The project aimed to increase agricultural products (rice) within 25 years under concession contract, which farmers rented small paddy fields from the owner year by year. Whole area of project covered around 1,350 km<sup>2</sup> (Figure V-1(A)). During 1906 – 1910, this project failed because there was limitation in land occupancy, labor, budget, and inefficiency rice product by acid soil problem. Consequently, number of paddy fields declined around 60% because irrigation system was destroyed by roads construction in 1936, and 1976 (Asawai, 1987) (Figure V-1(E)). Therefore, agricultural area in Khlong Luang, Lum Luk Ka, and Thanyaburi district can be regarded as kinds of farmland readjustment area<sup>2</sup> (Kounusay and Sadik, 2004) Because road network system in that period followed grid pattern of canal system, land configuration was in a geometric form such as rectangular, polygon, and narrow shape (Figure V-1(D)).

**Table V-1: Land use in Pathumthani province (Land use in hectare)**

	1980	1990	2000	% of Change from 1980-1990	% of Chang from 1990 - 2000
Agricultural Land	132,830.94	119,865.10	110,820.09	- 9.76	- 7.54
Built-up Land	12,479.80	28,210.91	33,807.24	126.05	19.83
Water Bodies	3,305.54	779.39	1,195.86	- 76.42	53.43
Golf Course	-	400.47	1,604.45	-	300.64
Recreation	-	-	26.79	-	-
Fallow Land *	3,349.42	2,958.52	4,866.28	- 11.76	64.48
Miscellaneous Land	-	72.21	152.34	-	110.97

Note: \* It is an uncultivated land or abandoned land

(Pravakar Pradhan and Ranjith Perera, 2004)

### 5.2.1. Site context, topography and land use

Khlongluang district is one of seven districts in Pathumthani that contains agricultural and residential land use with farmland readjustment context. According to significant local history mentioned above, Khlongluang district is selected as our target

<sup>1</sup> Population growth of BMR during 2004-2011; Bangkok 0.70%, Nakhonpathom 9.60%, Nonthaburi 21.16%, Pathumthani 34.26%, Samutprakarn 16.57%, and Samutsakorn 14.94%. Source: <http://th.wikipedia.org/wiki/กรุงเทพมหานครและปริมณฑล>

<sup>2</sup> Farmland readjustment in this paper means the way to organize and improve land into well-conditioned farmland and agricultural infrastructure. It is also used in terminology of paddy field land readjustment from Ministry of Agriculture, Forestry, and Fisheries of Japan. It. Source: *Annual Report on Food, Agriculture and Rural Areas in Japan, FY2003 by Ministry of Agriculture, Forestry, and Fisheries.*

area. Moreover, the highest number of housing unit of 128,859 units<sup>3</sup> is in Khlongsam sub-district. In addition, its agricultural land use was replaced by GHP (Figure V-1(B)). Hence, communities in Khlong Sam sub-district were selected as study areas. In Khlongluang district is an area that considerably developed in few decades ago and has significant land use transformation in long history. Khlongsam municipality is a part of Khlongluang district that area covers 48 km<sup>2</sup> and 59,003 people in 28,256 households; there are no high-rise housing units.

From the GIS analysis (see Table V-1), it is evident that 9.76% and 7.54% of agricultural lands have been converted to non-agricultural use from 1980 to 1990 and 1990 to 2000 in Pathumthani province respectively. Similarly, 76.42% of water resources have been transformed to other uses from 1980 to 1990, but that have been increased by 53.43% from 1990 to 2000. This happened due to the expansion of freshwater fishery farming in the province. According to Department of Fisheries, the land use for fish farm in 1990 was only 709 ha, but it was increased to 1,899 ha in 2000). The district level data on agricultural land was also analyzed. It shows that the huge portion of agricultural land has been converted to built-up areas in most of the districts. Muang Pathumthani and Thanyaburi districts have the highest conversion rate from 1980 to 1990 that more than 34% and 18% of the total agricultural land respectively. Similarly, again Thanyaburi and Muang Pathumthani districts have the highest rate of agricultural land conversion to built-up area from 1990 to 2000 that more than 23% and 22% of the total agricultural land respectively. Other districts have also converted agricultural land to built-up area but that are lesser than the above-mentioned two districts (Table V-2).

**Table V-2: Change of Land use from Agricultural to Built-up Area**

District	Agriculture Land in 1980 (ha)	Year 1980 - 1990		Agriculture Land in 1990 (ha)	Year 1990 - 2000	
		Built-up areas (ha)	Percentage of change		Built-up areas (ha)	Percentage of change
Muang Pathumthani	11,268	3,854	34.2	28,210.91	1,619	22.2
Khlong Luang	25,378	3,512	13.8	7,305	3,298	14.5
Thanyaburi	9,021	1,642	18.2	22,808	1,847	23.8
Lat Lum Kao	18,136	2,274	12.5	7,766	1,789	10.8
Lam Luk Ka	27,441	3,513	12.8	16,524	2,222	9.2
Sam Khok	10,562	1,098	10.4	24,154	1,513	15.5
Nong Sua	30,916	1,439	4.6	9,742	1,925	

(Pravakar Pradhan and Ranjith Perera, 2004)

<sup>3</sup> Number of houses in seven districts of Pathumthani province; Amphomueng Pathumthani 87,226 units, Khlong Luang 128,859 units, Nong Suea 15,368 units, Lat Lum Kao 28,625 units, Lum Luk Ka 119,845 units, Sam Khok 19,936 units, and Thanyaburi 89,924 units. Source: [http://stat.dopa.go.th/xstat/p5513\\_01.html](http://stat.dopa.go.th/xstat/p5513_01.html)



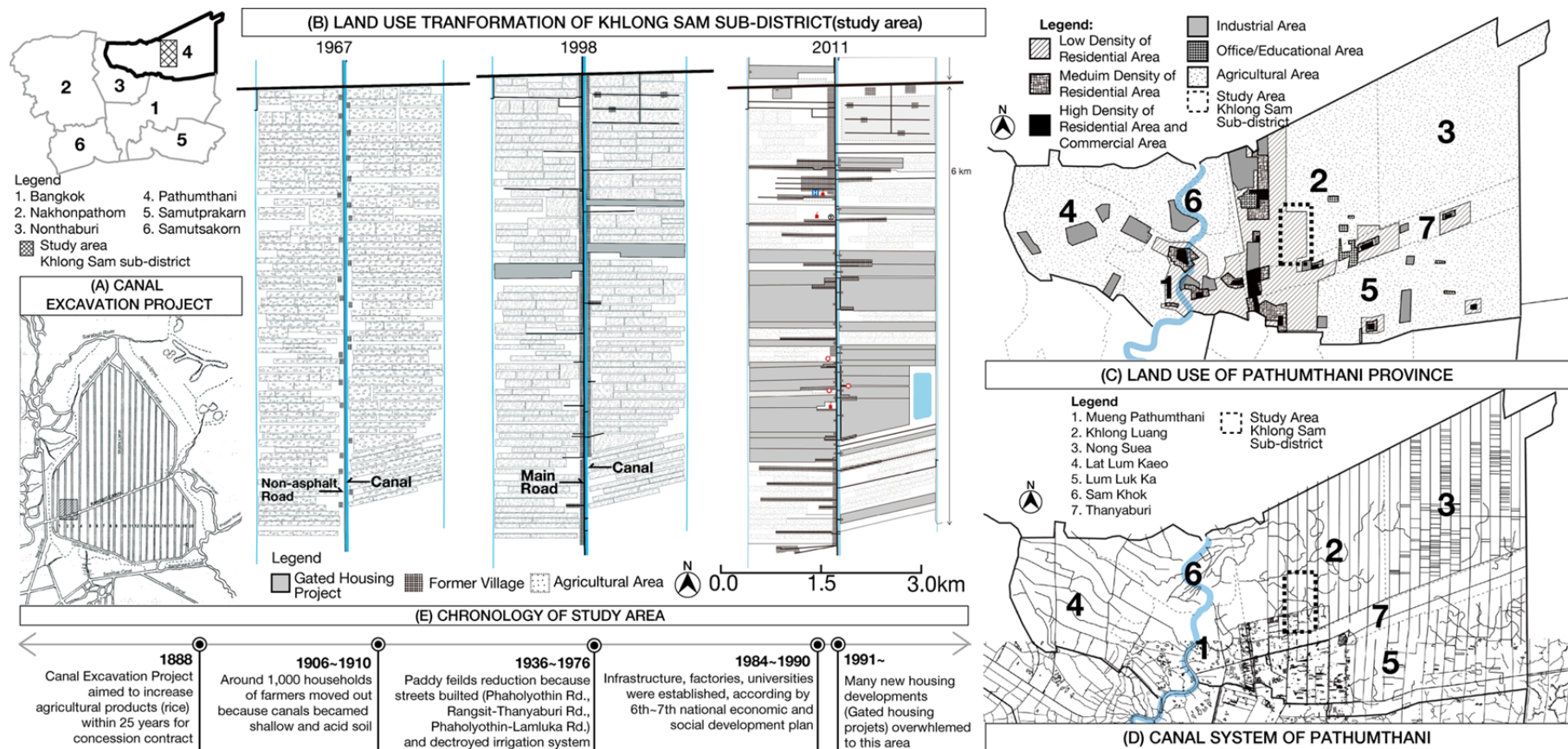
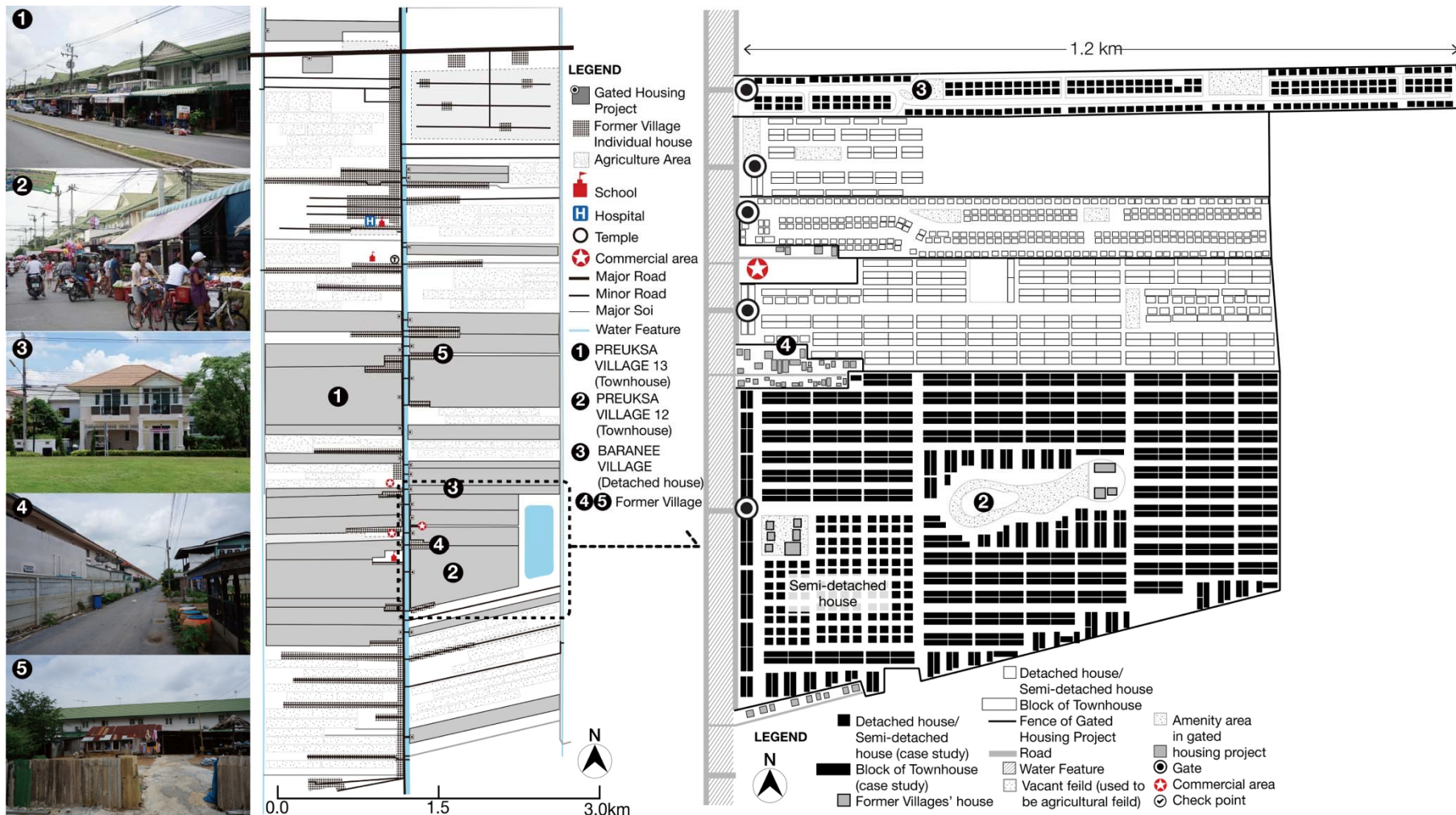


Figure V-1: Land use and Canal system of Pathumthani province

(Source: author, 2013)



**Figure V-2: Characteristic of Gated housing project and Land composition**

(Source: author, 2013)



### 5.2.2. Residential Development in study area

Because GHP and other communities are private properties, we could distribute questionnaires and survey to only allowed projects or communities by owners. During physical observation, we found the extent of study area is determined with only one main road, which is parallel to main canal (Figure V-2). The buildings, locating along the public road, are mixed functions between residential and commercial uses as ribbon development. Those residential types are shophouses and townhouses, while residential single-use buildings are in housing projects and cluster of former villages. The accesses of housing projects and group of former villages locate next to the main road, but their appearances are totally different as shown in Figure V-3.



Gate of GHP-T



Gate of GHP-D



Access of HP



Access of FV

**Figure V-3: Road access to housing project and former village**

(Source: author, 2012)

The accesses can determine identity of residential community. There are remarkable five typical residential communities (Figure V-4). These five cases represent five existing types of community; gated housing project with detached house (GHP-D),

gated housing project with townhouse (GHP-T), former village (FV), Housing project (HP) without gated, and Individual House (IH). For physical survey and questionnaire distribution inside community, it was difficult to enter every visible community because they are private properties that need permissions. However, the survey was carried on within this limitation.



(A) Individual House (IH)



(B) Housing project without gate (HP)



(C) Gated Housing Project with Townhouse (GHP-T)



(D) Gated Housing Project with Detached houses (GHP-D)



(E) Former Village (FV)

**Figure V-4: Five types of community in study area**

(Source: author, 2012)

The physical observation revealed that GHP-T has better physical environment than others, namely, it has aesthetic elements and temporary commercial area that makes community livelier. GHP-D provides good environment with many aesthetic architectures and features, but lacks of shops. On the other hand, FV has poor physical environment due to a lack of aesthetic elements and cleanness. During site observation, GHP is usually located by main road and parallel to canal. Because there is only one main road next to canal in the west side, people who live the opposite side have to connect by their own bridge. While, FV is located on a small alley on both sides of canal. GHP-T's plot is in geometric form in huge scale (around 1 km. length); hence, they can contain over 1,000 households in a project. On the other hand, GHP-D and FV is in a narrow shape. GHP's appearance has distinguished symbol such as decorative gate and clear boundary as high fences (Figure V-4). All GHP and FV face to the road with only one access, so they cause traffic conjunction during rush hours and inconvenience of public facility usage outside community.

### **5.2.3. Current situation and problems**

After physical survey has done, we can realize overall problems in living of residents and citizen. In public area, the water pollution has obviously seen garbage and water hyacinths floating on main canal, and it is getting rotten (Figure V-5(A)). Although the main road has been expanded because of increasing automobile demand, the traffic has still congested during rush hour in the morning. As there is no clear margin between car's lane and pavement, there are confusion of pavement's usages along the main road and lead to more traffic problems.

The former villages, which locate opposite side of the road, have to make small wooden bridges crossing the canal by themselves. The quality of entrance is not quite good and can make a risk to villagers (Figure V-5(B)). The environment in FVs is getting poorer and lacking of well maintenance from local government (Figure V-5(H)). In addition, the significant effect from congested GHP is the unintentional obstruction by 'walls' enclosing GHP. Normally, FVs have no 'walls' enclosing entire communities, but the congestion of GHPs let their walls dividing GHPs from FVs. This affects on way of living of former villagers behind the walls. For instants, villagers lost air ventilation from natural wind, additionally, they miss the opportunity to extend or connect their common streets to another main roads (Figure V-5(F-G)). Inside some gated housing projects of townhouse (GHP-T), we obviously notice some townhouses, which are partially adapted to shops, nearby the gates. They became commercial areas inside community and let many outsiders go through the community. Although this allowance makes liveliness meanwhile it also leads to crowded and fear of crime to inside residents. Moreover, GHP-Ts in study area contain a lot of housing units; the biggest project reaches 1,000 units with only one gate entrance. This situation generates traffic problem inside community.





(A) Water Pollution



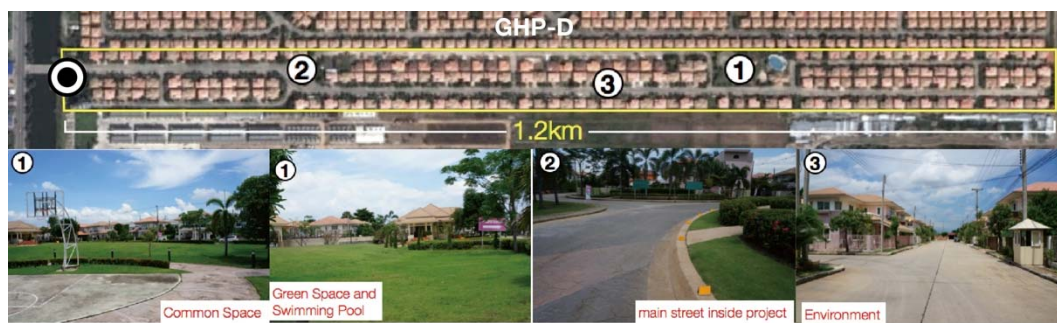
(B) Access of FV



(C) Crowded in GHP-T



(D) GHP-T site plan



(E) GHP-D site plan



(F) GHP's walls enclose FV



(G) GHP's walls block FV



(H) Poor environment

**Figure V-5: Overall problems in study area**

(Source: author, 2012)

At the same time, GHP-Ds that provide common amenities, such as, swimming pool and park, for privatization, residents' agreement allows temporary sharing the amenities with outsiders. This leads privacy reduction on inside residents. Therefore both residents in GHP-Ts and GHP-Ds are facing ordinary problems of living through this survey. These findings in physical observation can confirm the assumption of research that physical environment influences on living of residents and may affect on social relationship by effects of uncontrolled GHP development.

### **5.3. Questionnaires survey for inside and outside communities**

As literature review, Lochner, et al. summarized common concept used in that measurement of neighborhood cohesion from many scholars during 1978 – 1997, hence this paper implied mutual questions from those results. The concept of questionnaire structure was applied from the idea of social capital measurement, and observation sheet was applied from neighborhood design and sense of community (Roger, G.O. and Sukolratanamettee, S., 2009). The complete explanation is clearly described in Chapter IV, however, it will be referred briefly again in this section. The content of inside relationship assessment in the questionnaire is as follows; 1) membership, or the sense of feeling as part of group; 2) influence, or sense that individual matters to the group and the group can influence its members; 3) integration, or shared value/fulfillment of needs; and 4) shared emotional connection, or the sense of shared history in the community. Outside relationship was conducted by; 1) outside activities you did in daily life, 2) motivation you attended occasionally outside event, 3) physical elements of GHP make you feel segregation, and 4) perception on surrounding or outside community. Questionnaire strives to assess neighborhood relationship inside and outside community that is a part of neighborhood assessment.

The objective of these parts is to expose different neighborhood relationship, and to compare inside and outside relationship among three types of community. Then, the neighborhood relationship inside and outside community are analyzed in section 5.3.1 – 5.3.2 and tendency analysis in section 5.3.3. Research population is calculated by Taro Yamane's formula with sample error 0.05. As a result, we need 400 respondents from 73,446 populations in Khlongsam sub-district but we can collect only 294 respondents, according to the limitation of time and restrict access in GHP.

We randomly distributed questionnaires in five types of community follow these conditions; 1) residents who live inside a gated housing project in both detached houses and townhouses; 2) inhabitants who live outside a gated housing project such as former villages. The questionnaires were distributed by face-to-face acquirement during August 19-21, 2012. It was quite difficult to collect a lot of samples in GHP because of restriction and regulation.



### 5.3.1. Characteristic of respondents in case study area

Because the first objective of questionnaire aims to investigate individual characteristics of respondents in different communities, the results were analyzed by descriptive statistic, such as, frequency, percentage, and means. We revealed background of respondent as shown in Table V-3.

The average age of respondents is similar in all types of community. Number of family member can reflect size of household, and then, can indicate approximate population density inside community. The IHs has the biggest families, but FVs become the smallest even they are former communities. Period of travel is a good question to mirror the transportation problem within district, and its answer is connected with location of workplace. Most residents in FV, GHP-D, GHP-T, and HP work as company officers and governmental officers in Pathumthani, but they waste travel time to work over 45 minutes, especially GHP-D's respondents take around 53 minutes. Moreover, the average monthly income is 10,001 – 30,000 THB. This presents homogeneous social class among different type of communities. The change of dwelling type can examine the expansion of household. The result shows major respondents are familiar with the same type of housing unit and have small change from shophouses to townhouses in GHP-Ts. The reasons of choosing houses among five type of communities are significant different, namely; GHP-Ts and IHs concern about affordable price of units; FVs focus on size of house; HPs pay attention on environment inside communities; and GHP-Ds think about environment outside communities.

**Table V-3:** Characteristic of Respondents in Khlongluang district

Part 1: Background of Inhabitants						
Total 294	FV	GHP - D	GHP - T	HP	IH	Total
Age (yrs)	Mean: 41.30 (N=37) Std. 8.784	Mean:40.19 (N=68) Std. 12.090	Mean:37.59 (N=78) Std. 11.161	Mean:38.73 (N=41) Std. 9.859	Mean:37.84 (N=70) Std. 10.082	Mean:38.88 (N=294) Std. 10.709
Family member (persons)	Mean: 3.50 (N=16) Std. 1.366	Mean: 4.00 (N=39) Std. 1.686	Mean:3.66 (N=50) Std. 1.479	Mean:3.93 (N=29) Std. 1.307	Mean: 4.67 (N=48) Std. 1.629	Mean:4.03 (N=182) Std. 1.571
Time to go to work (mins)	Mean:46.50 (N=16) Std. 37.769	Mean: 53.63 (N=24) Std. 37.627	Mean:45.86 (N=29) Std. 24.019	Mean:45.33 (N=15) Std. 24.529	Mean:41.94 (N=31) Std. 24.037	Mean:46.44 (N=115) Std. 28.925
Period of dwelling (yrs)	Mean:18.46 (N=37) Std.11.062	Mean:6.58 (N=66) Std. 4.261	Mean:6.49 (N=76) Std. 4.740	Mean 8.79 (N=39) Std. 5.800	Mean:6.71 (N=62) Std. 8.271	Mean:8.46 (N=280) Std. 7.839
Occupation (%(N))	N =37	N =68	N =78	N =41	N =70	N = 294
Government officer	<b>37.8% (14)</b>	22.1% (15)	23.1% (18)	19.5% (8)	17.1% (12)	22.8% (67)
Company officer	13.5% (5)	<b>36.8% (25)</b>	<b>33.3% (26)</b>	<b>48.8% (20)</b>	<b>38.6% (27)</b>	35.0% (103)
Business owner	24.3% (9)	1.5% (1)	5.1% (4)	4.9% (2)	1.4% (1)	5.8% (17)
Shopkeeper	8.1% (3)	17.6% (12)	20.5% (16)	14.6% (6)	21.4% (15)	17.7% (52)
Freelance	8.1% (3)	22.1% (15)	10.3% (8)	12.2% (5)	21.4% (15)	15.6% (46)
Other	8.1% (3)	0.0% (0)	7.7% (6)	0.0% (0)	0.0% (0)	3.1% (9)
Workplace (%(N))	N = 37	N =67	N =78	N = 41	N =69	N = 292
Bangkok city	21.6% (8)	20.9% (14)	20.5% (16)	12.2% (5)	30.4% (21)	21.9% (64)
Vicinity (Pathumthani)	<b>48.6% (18)</b>	<b>32.8% (22)</b>	<b>43.6% (34)</b>	<b>70.7% (29)</b>	33.3% (23)	43.2% (126)
Work at home	27.0% (10)	46.3% (31)	29.5% (23)	17.1% (7)	<b>36.2% (25)</b>	32.9% (96)
Unemployed	2.7% (1)	0.0% (0)	6.4% (5)	0.0% (0)	0.0% (0)	2.1% (6)

Income (%(N))	N =37	N =68	N = 77	N =41	N =70	N = 293
Under 10,000 B.	8.1% (3)	10.3% (7)	11.7% (9)	9.8% (4)	10.0% (7)	10.2% (30)
10,001 – 30,000 B.	<b>75.7% (28)</b>	<b>70.6% (48)</b>	<b>81.8% (63)</b>	<b>85.4% (35)</b>	<b>64.3% (45)</b>	74.7% (219)
30,001 – 50,000 B.	16.2% (6)	17.6% (12)	5.2% (4)	4.9% (2)	18.6% (13)	12.6% (37)
50,001 – 70,000 B.	0.0% (0)	0.0% (0)	1.4% (1)	0.0% (0)	7.1% (5)	2.0% (6)
Over 70,000 B.	0.0% (0)	1.5% (1)	0.0% (0)	0.0% (0)	0.0% (0)	0.3% (1)
Mean	2.08 (Low)	2.07 (Low)	1.96 (Low)	1.95 (Low)	2.23(Low)	2.56
Std.	0.493	0.531	0.471	0.384	0.726	0.555
Legend:	1.00 – 1.49 = Very Low		1.50 – 2.49 = Low		2.50 – 3.49 = Average	
	3.50 – 4.49 = High		4.50 – 5.00 = Very High			
Part 2: Residential unit background						
	FV	GHP - D	GHP - T	HP	IH	Total
Previous dwelling (%(N))	N = 36	N = 68	N =78	N =41	N =69	N = 292
Detached house	<b>63.9% (23)</b>	<b>66.2% (45)</b>	15.4% (12)	26.8% (11)	17.4% (12)	35.3% (103)
Townhouse	5.6% (2)	5.9% (4)	<b>35.9% (28)</b>	12.2% (5)	7.2% (5)	15.1% (44)
Apartment	8.3% (3)	13.2% (9)	17.9% (14)	19.5% (8)	7.2% (5)	13.4% (39)
Shophouse	19.4% (7)	11.8% (8)	26.9% (21)	<b>36.6% (15)</b>	<b>62.3% (43)</b>	32.2% (94)
Semi-detached house	2.8% (1)	2.9% (2)	3.8% (3)	4.9% (2)	5.8% (4)	4.1% (12)
Why you live here (Multiple choosing)						
Near Workplace		5.6%	12.0%	19.0%	11.7%	8.5%
Affordable price		19.4%	10.0%	<b>21.4%</b>	13.0%	<b>17.1%</b>
Good design and material		16.7%	11.0%	6.0%	9.1%	6.1%
Proper Size		<b>23.6%</b>	9.0%	15.5%	10.4%	13.4%
Credible Developer		0.0%	7.0%	6.0%	5.2%	8.5%
Good Environment (inside community)		2.8%	10.0%	9.5%	<b>14.3%</b>	4.9%
Good Environment (outside community)		0.0%	<b>16.0%</b>	7.1%	10.4%	12.2%
Lively community		5.6%	9.0%	4.8%	9.1%	7.3%
Near public facility		2.8%	4.0%	2.4%	3.9%	1.2%
As my birthplace		5.6%	8.0%	0.0%	1.3%	15.9%
Being agriculturists who lived here		1.4%	3.0%	1.2%	3.9%	3.7%
Family move in		16.7%	1.0%	6.0%	7.8%	1.2%
Other		0.0%	0.0%	1.2%	0.0%	0.0%
Legend: FV = Former Village    GHP-D = Gated Housing Project (Detached house)    GHP-T = Gated Housing Project (Townhouse) IH = Individual House    HP = Housing Project without Gate    N = Number of respondent						

### 5.3.2. Evaluation of Neighborhood Relationship

The results from questionnaire distribution are presented in two formats; mean and percentage, according by questions and answers. Questions about satisfaction and perception are displayed in average of means, while another questions are exhibited in percentage of number of chosen answers.

In Table V-4, GHP-D and HP highly satisfy on inside environment of community, whereas others reach average satisfaction. When consider means of satisfaction, FVs touch the lowest means of environmental satisfaction that is contrary with GHP-D. This evidence affirms well-community design in GHP-D that can response fulfillment of inside residents, and atmosphere in FVs become poorer according by threat from surrounding GHP. GHP-Ts have the lowest means of satisfaction among housing developments because adjustment of adding commercial area in projects lead to fear of crime and non-privacy. Although degree of trust on neighbors in all types of community reach the same degree, the value of means show GHP-Ds have the highest trust on neighbors. This outcome is quite unexpected that newcomers have higher trustfulness than former villagers who live in this area longer. The feeling on success of community can reflect how much integration they have. As shown in question 3.5.3 of Table V-4, housing project developments; GHP-D, GHP-T, and HP, have higher integration between

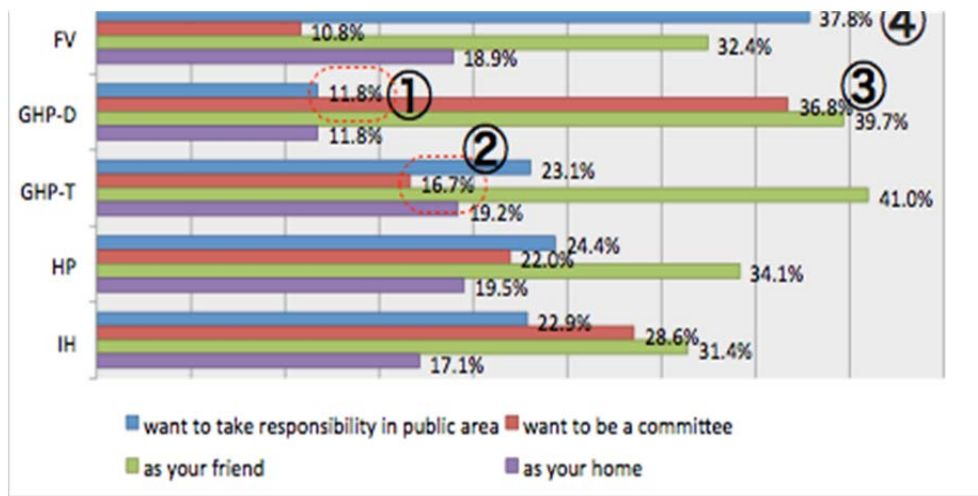
residents and community than unplanned communities. For perception on surrounding community, GHP-Ds reach the lowest means of perception because of insufficient main road bringing traffic congestion. GHP-Ts have the highest perception because partial areas in communities are adapted to be shops and markets. The outsiders become their customers that can promote business activities inside community.

**Table V-4: Means of chosen answers in FON and OR factors**

Part3: Integration and Fulfillment of Needs (FON)						
Satisfactions/feeling	FV	GHP-D	GHP-T	HP	IH	Total
3.5.1.Environmental Satisfaction	Means: 3.03	Mean: 3.79	Mean: 3.37	Mean: 3.55	Mean: 3.49	Mean: 3.48
	(N=36)	(N=66)	(N=78)	(N=40)	(N=70)	(N=290)
	Std. 0.696	Std. 903	Std. 0.870	Std. 0.815	Std. 0.812	Std. 0.861
3.5.2.Degree of trust to neighbor	Means: 3.11	Mean: 3.48	Mean: 3.14	Mean: 3.38	Mean: 2.89	Mean: 3.19
	(N=36)	(N=66)	(N=78)	(N=40)	(N=70)	(N=290)
	Std. 0.398	Std. 0.980	Std. 0.893	Std. 0.807	Std. 0.956	Std. 0.896
3.5.3.Your feeling when someone help your community	Means: 3.69	Mean: 3.86	Mean: 3.71	Mean: 3.92	Mean: 3.56	Mean: 3.73
	(N=35)	(N=66)	(N=78)	(N=39)	(N=70)	(N=288)
	Std. 0.530	Std. 0.857	Std. 0.744	Std. 0.807	Std. 0.735	Std. 0.763
Legend:	1.00 – 1.49 = Very Low		1.50 – 2.49 = Low		2.50 – 3.49 = Average	
	3.50 – 4.49 = High		4.50 – 5.00 = Very high			
Part5: Perception to surrounding community						
	FV	GHP-D	GHP-T	HP	IH	Overall
5.2. Perception to outside community	Means: 2.22	Means: 2.12	Means: 2.19	Means: 2.26	Means: 2.17	Means: 2.18
	(N=36)	(N=67)	(N=73)	(N=39)	(N=69)	(N=284)
	Std. 0.540	Std. 0.537	Std. 0.490	Std. 0.498	Std. 0.382	Std. 0.485
	1.00 – 1.49 = Feel Bad		1.50 – 2.49 = Neutral		2.50 – 3.00 = Feel Good	
Legend: FV = Former Village    GHP-D = Gated Housing Project (Detached house)    GHP-T = Gated Housing Project (Townhouse)						
IH = Individual House    HP = Housing Project without Gate    N = Number of respondent						

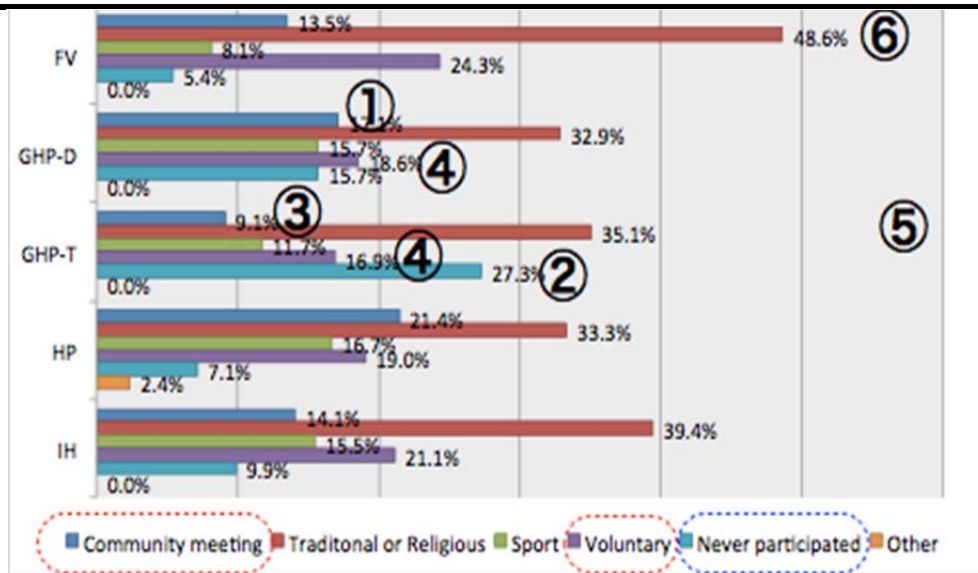
From Table V-5 to Table V-9 display results of questions in percentage of chosen answers, divided by five types of community as bar chart. Therefore, the comparison of different agreements can be obviously noticed. Each table also presents series of inquiries that evaluated four dimensions of neighborhood relationship both inside and outside communities. Their interpretations are added into the table in the right column following the purpose in Chapter IV.

**Table V-5: Answers of Membership in bar chart of percentage**



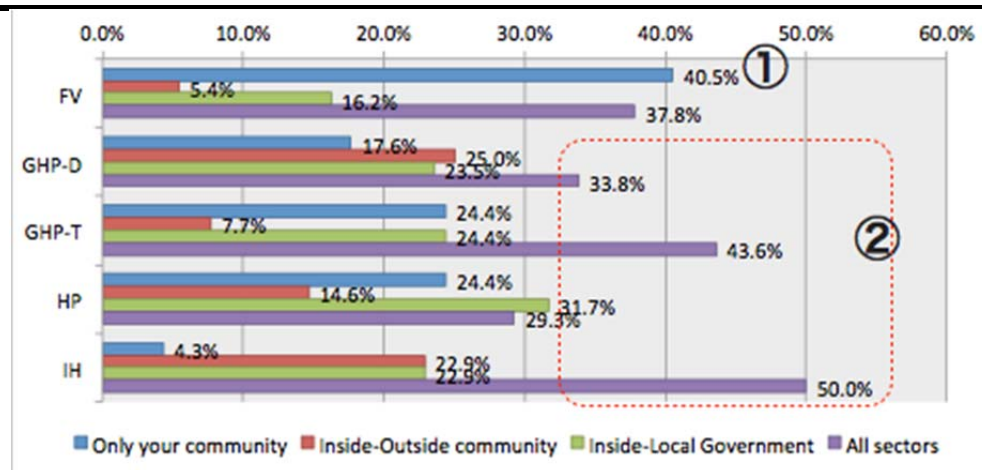
### 3.1 Perception: Your perception on public area

This question can show mindedness of respondents in community, especially 'taking responsibility in public area' and 'being a committee'. ④ FV has high mindedness as many as 37.8%, but they have the lowest desirement to play role in whole community (10.8%). On the other hand GHP-D has contradictory result, GHP-D lacks of mindedness ① but they ragard community meeting as in designated regulation③. The unexpected result is that GHP-T has less awareness on community meeting in regulation of GHP②. This reflects noncooperation in GHP-T.



### 3.2.1 What's kind of inside activity you often participated? (multiple choose)

Community meeting is a fixed composition of GHP according to regulation. Voluntary can show sacrifice. 'Never participated' can show noncooperation. These activities may refer to behavior of respondents and common interesting activities that lead to the way to enhance inside relationship. The common interesting activity is traditional or religious activity<sup>⑤⑥</sup>. Because GHP-T has less awareness of management in community, they hardly attend the community meeting (9.1%<sup>③</sup>). Community meeting and sport cannot gather respondents in GHP-T to join. Moreover, GHP-T is only one community that respondents have never participated any activities<sup>②</sup>

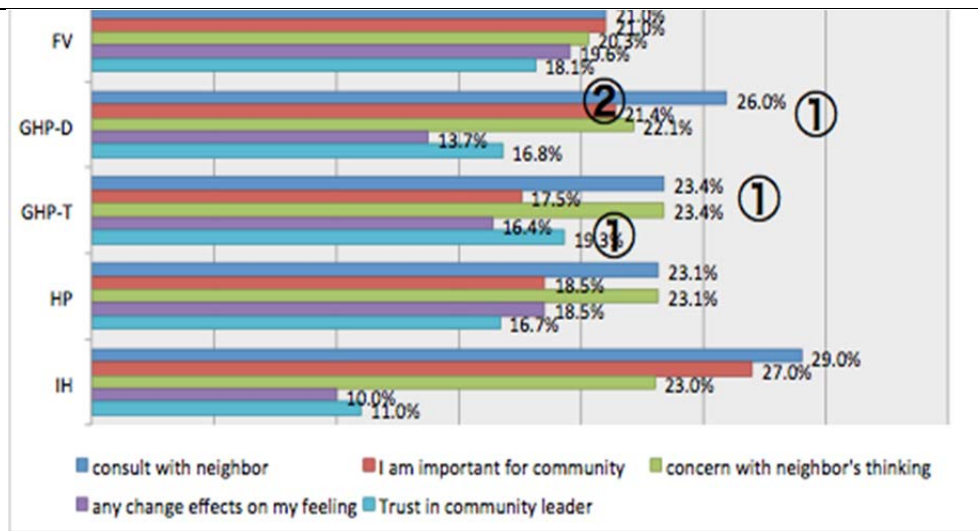


### 3.2.2 Who is participant you would like to join with?

This question reflects the closeness of community. As many as 40% of respondents in FV behave like closed community<sup>①</sup>. While other communities are opened communities. The noticeable point is that GHP-D and GHP-T also prefer to be opened community<sup>②</sup>. This result may relate with loosely controlled gate as physical observation's result.

As concept of 'membership' factor can identify the sense of feeling part of a group, the perception on neighbors or common area of community is examined. The series of questions are composed according to the sense of community and ideas during site survey. Perception on public area, prospected role, neighbors, and entire community are asked to show range of sense of belonging from fundamental to profound feeling of a group. Moreover, preference of participated activity can refer to promotable events that support neighborhood relationship, and kind of participants can mirror the closeness of community.

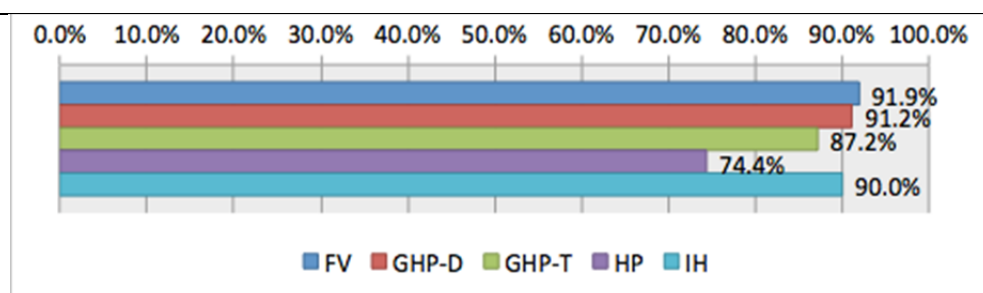
**Table V-6: Answers of Influence's questions in bar chart of percentage**



### 3.3 Influence: Your sense that matters to community and the community can influence you (multiple choose)

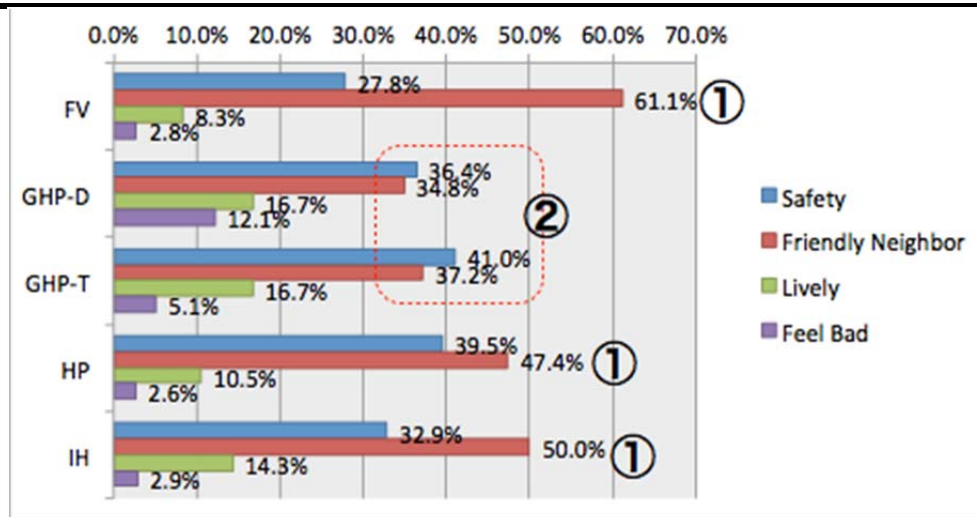
In IFE factor, the answer can reflect who is the most influencer in community. That can define who should be an initiator in promotable activities. We found almost respondents attach with neighbors especially in IH①. Meanwhile respondents in HP, FV, and GHP-D realize their roles in community.

**Table V-7: Answers of Integration and Fulfillment of Needs in bar chart of percentage**



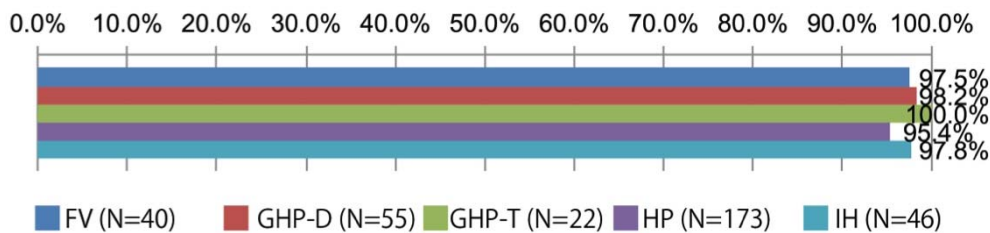
### 3.4.1 Community can address problems by themselves

Only HP's respondents have at least belief in own community's capability.



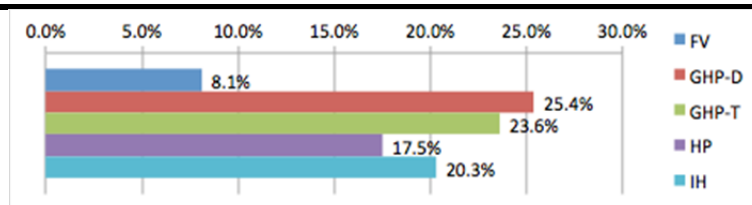
### 3.4.2 Your perception to inside community (multiple choose)

Although only GHP-D and GHP-T have higher sense of safety than other communities②, this result is under expectation. GHP is expected to increase sense of safety by fence and gate but the difference of sense of safety is not big different. That argues the previous studies. Other communities have positive perception on neighbors ①.



### 3.5.4 Best thing for community as yours

Every respondents in GHP-T congratulate when community is improved and feel like as their own.



### 3.5.5 Housing problems

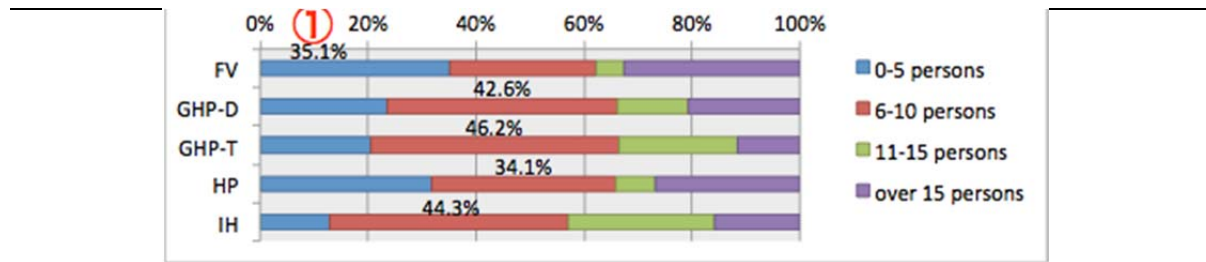
Although GHP-D provide better quality of environment inside community, but 25.4% of respondents still face problems in living. While FV has less problems even they are enclosed by wall and fence of GHP. This support that elements of GHP cannot innfluence on social relationship of FV.

The 'Influence' factor (Table V-6) indicates the strength of bond of community through conformity and community influence on members. We found the conformity between influence of community and members as shown in similar proportion of chosen answers. The conclusion of strength of bond is calculated by accumulation of chosen



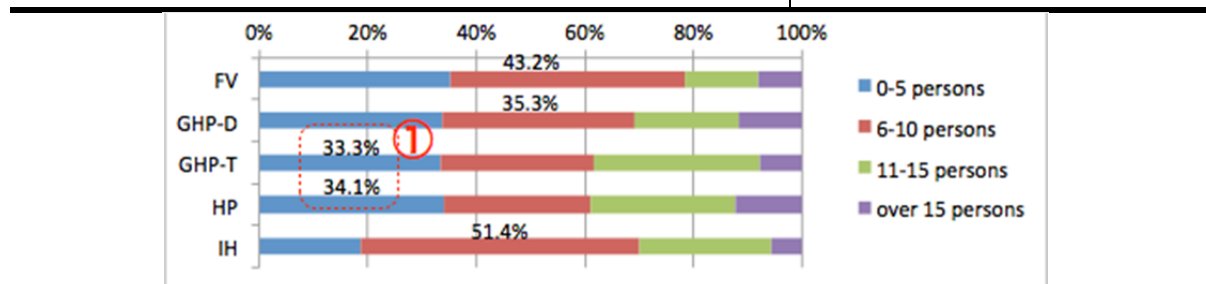
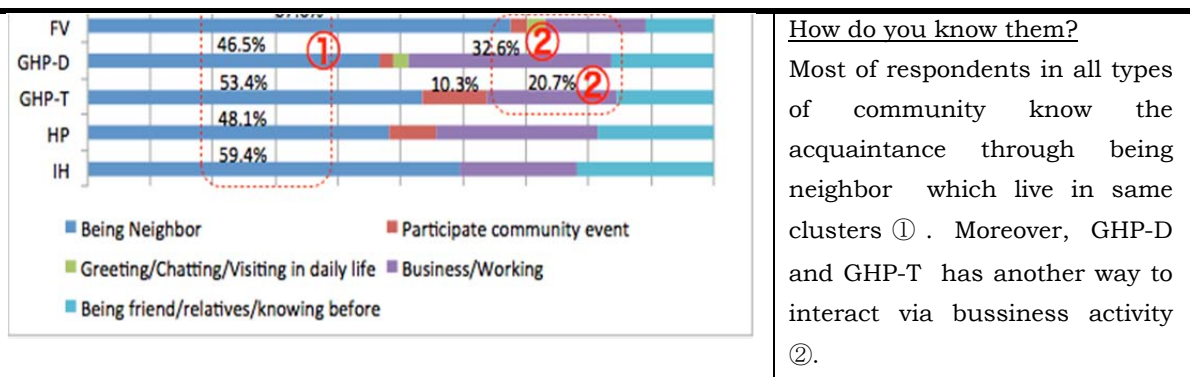
answers. Table V-7 shows the 'Integration and Fulfillment of Needs' that is a primary function of a strong community. It is investigated through agreement of statement of satisfaction and perception on success of community and competence of capabilities of other members. The perception on community is checked in different viewpoint from membership factor, here intend to investigate that community can or cannot fulfill needs of members. Additionally, a part of series of questions is presented in Table V-4 (part 3).

**Table V-8: Answers of Shared Emotional Connection in bar chart of percentage**



### 3.6.1 Number of acquaintances inside community

All types of community, excluding FV, have number of acquaintance around 6-10 persons, although scale of community is different. 35.1% of FV's residents have few acquaintances even though they live in area longer than others①.

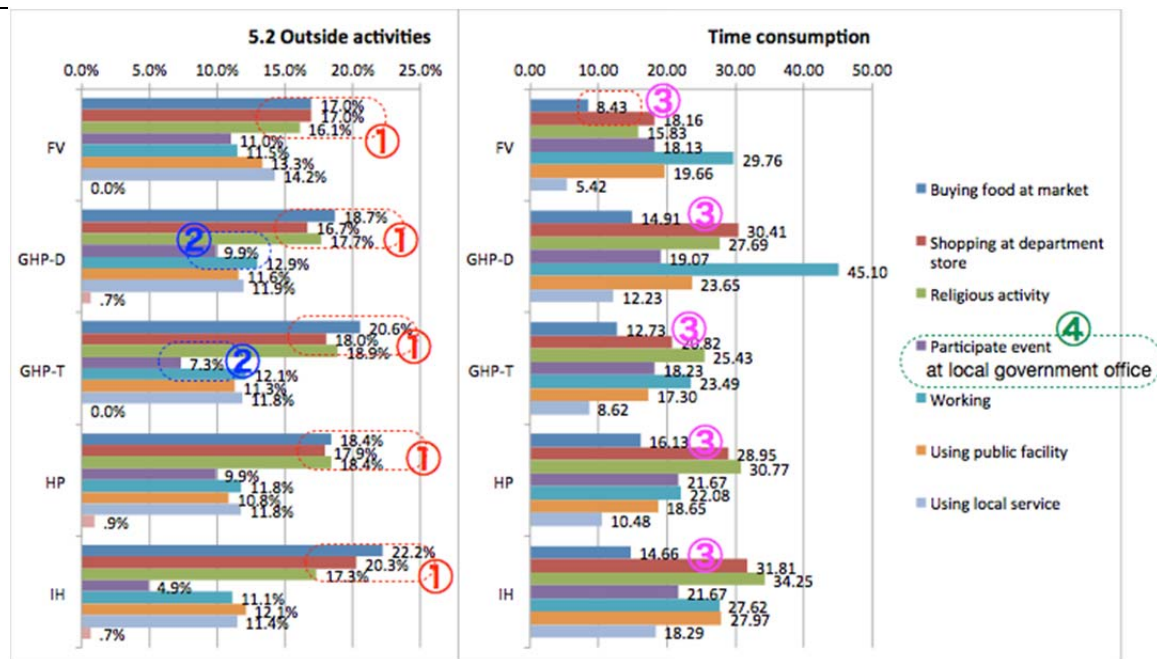


### 3.6.2 Number of friends inside community

Although HP and GHP-T have acquaintance around 0-5 persons ①, number of friends are lower. Thus it assumes that they have superficial relationship between neighbors and respondents. While FV's respondents have number of friends higher than number of acquaintances, that means FVs have deeper relationship between neighbors and members.

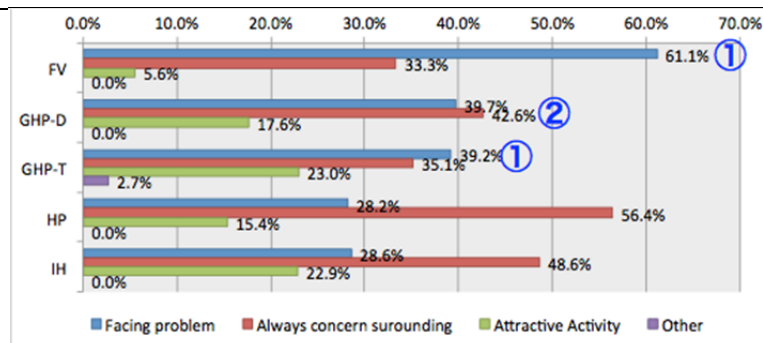


Table V-9: Answers of Outside Relationship in bar chart of percentage



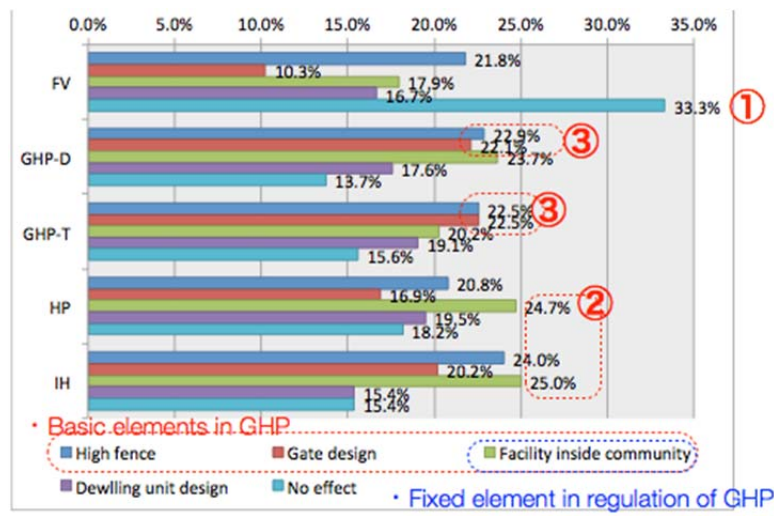
### 5.2 Outside activities in your daily life

When compare results among five types of community, we found they have similar behaviors of outside activity's participation. Thus the appropriate places that can increase interaction are fresh market, department store, and temples①. Because residents take shortest time to go to market, the market seems to be node of district③. GHP-D and GHP-T have no attraction on public event by local government②④.



### 5.3 Motivation to join outside event (multiple choose)

When respondents experience in crisis, 61.1% of FV① can be gathered and prompt to help others. GHP-D② have personal interest on surrounding concerns.



#### 5.4 Physical design of gated housing projects effect on social segregation (multiple choose)

It seems to be fence of GHP effect on respondents' feeling in similar way. Only 22.1% - 22.5% of GHP-D and GHP-T think gates can effect on social segregation<sup>③</sup>.

Moreover, the interesting result is 33.3% of FV<sup>①</sup> think all elements of GHP have no effect on social isolation.

The questions in series of outside relationship assessment are asked points of view from individual respondents to outside community through number of activities, reasons to go outside community, and physical elements as mentioned at the beginning of section. As the results in Table V-9, the common activities among different communities are buying food, shopping, and religious event. Therefore, these activities can create opportunity of social interaction, and local government should promote them. According to literature review, the crisis experience highly impacts on relationship of residents because they can share ideas to figure out solutions. Thus, respondents who attend outside activities while facing problems tend to have better outside relationship.

In addition, outside relationship is more emphasized through marking the location of 'places' which respondents have actions following the chosen answers in question 5.3.2. Those locations are marked in map of site study (as shown in Figure V-6). We found distinctive behavior of respondents to do activities outside their communities. As evidences, it seems 'fresh market' and 'department store' is the nodes of district because most of respondents go shopping in the same area (No.1 and 2 in Figure V-6). The nodes are close to most settlements of respondents, except HP community. In other words, the public area providing these activities can promote more opportunities of social interaction among residents.



## Khlogluang district, PATHUMTHANI province



### LEGEND: Outside activity

1. Buying food at Market
2. Shopping at Department Store
3. Religious activity
4. Participate public event
5. Working
6. Using Public Facility; hospital, government office, park
7. Using Local Service; Salon, small grocery store

### LEGEND:

- Respondent's house
- Friends / Acquaintances
- Gated Housing Project
- Landmark; Temple, Government Office, Commercial center



Figure V-6: Outside Activity Map

(Source: author, 2013)

#### 5.4. Attitude of external stakeholder (developers and local government officers)

In order to understand stakeholder's perspective on GHP, it is unavoidable to interview developer and local government officer. We interviewed representative of private developer (Prueksa Real Estate Public Company Limited, 2012) who is the main player in this area. The interviewee is a person in charge of townhouse projects (GHP-T), the largest occupancy of residential project in study area.

**Table V-10: Opinion of a representative of private developer**

(Source: author, 2012)

Part 1: Overall information of company	Part 2: Attitude about effect of housing projects (They think...)	Part 3: Vision on housing development change in the future
<ul style="list-style-type: none"> <li>• Target group: Blue collar</li> <li>• Segment: Townhouse 0.8~1.5 million THB</li> <li>• Concept: 'Value for money'</li> <li>• Construction process: 1) Land requirement, 2) Pre-sale 3 months, 3) Complete sale in 18 months</li> <li>• Prospected location: suburban of BMR</li> <li>• Very large land plot results in controllable land cost</li> <li>• Development process: 1) Land requirement 2) Market research 3) Feasibility 4) Pre-Sale 5) Selling 6) Initially set up juristic committees for residents</li> </ul>	<ul style="list-style-type: none"> <li>• Their projects' scale seem to create a small new town</li> <li>• They provide some infrastructure such as water and electrical supply for surrounding communities</li> <li>• It needs to balance concept of land allocation act, business, and taxation</li> <li>• They try to control circumstance inside the projects</li> <li>• They design more activity spaces in common area of project such as big and functional gardens</li> <li>• They follow up maintenance of common spaces and design easily looking after by inside residents</li> <li>• A project should have only one gate with security</li> <li>• They hold activities that company and residents can participate</li> </ul>	<ul style="list-style-type: none"> <li>• Shift design and brand image but keep focusing on the same segment: smaller scale of project because of higher land value</li> <li>• Community design is possible to apply for business but it still needs 'value engineering' and 'feasibility' to maintain margins and more contribute to customers</li> <li>• Liveliness in community could be sustainable branding and suit for their targets</li> <li>• Flooding protection: preparation of higher reclaimed land level, flooding protection wall, effective water pumps, and effective public relations to create more reliance</li> </ul>

In Table V-10, we found that developers can response right target with shortest period of selling. The prospected locations of current and future GHP-Ts are in peripheral of BMR. This can confirm that the suburban area is still being the target area of GHP-T development in the near future. Because the signature of project is 'value for money', the huge land plot can control land cost and generate higher margins. This sense affirms why size of GHP-T is very large. In process of project development, each step has no consideration about social impact assessment. The general assessment for housing development is about environment and business feasibility. The success of project is indicated through margins and period of selling. Therefore, there is no any solid consideration of social impact and residents' living. It can easily affect on quality of living for inside and outside residents.

When attitude and opinions about effect of housing projects were asked, they thought they provide some features to promote social relationship of inside residents

through; 1) provide some infrastructure for public, 2) design functional park and activity space inside the project, and 3) follow up maintenance for common space inside project. In terms of vision on GHP in the future, ‘community design and neighborhood concern’ can be promoted in business and branding. They also have plans to shift housing unity design and branding image, but keep focusing in same segment. However, ‘value of engineering’ and ‘feasibility’ is still required to maintain the margins. They suggested that ‘liveliness in community’ is suitable for their targets. Hence, well-community design could be promoted as sustainable branding in housing estate.

**Table V-11: Opinion of a representative of local governmental officer**

(Source: author, 2013)

Part 1: Background of communities in municipality	Part 2: Attitude about effect of housing projects (They think...)	Part 3: Change and vision on community development in the future
<ul style="list-style-type: none"> <li>Physical environment: existing only 2 routes (local road 17km, main road 5km)</li> <li>Local community lives along canal and local road</li> <li>Contain 16 administrative villages that includes former villages and gated housing projects</li> <li>Municipality held many activities such as voluntary for self-security or traditional events (response from inhabitant 70% and GHP residents 30%)</li> </ul>	<ul style="list-style-type: none"> <li>Disadvantages from GHPs:               <ol style="list-style-type: none"> <li>Poor quality to natural water</li> <li>Construction of GHP leads to poor quality of street's surface</li> </ol> </li> <li>Advantages from GHPs:               <ol style="list-style-type: none"> <li>Motivate local economic</li> <li>Lead to commercial area creation such as free market, wholesale, supermarket</li> </ol> </li> <li>Role of municipality: public facility, training career support</li> <li>General problems: poor quality of public facility, drugs, traffic, and road network</li> </ul>	<ul style="list-style-type: none"> <li>Change:               <ol style="list-style-type: none"> <li>Better physical public facility</li> <li>Adequate water supply</li> <li>Gradually increase of GHPs (7 years ago had only 2 projects)</li> <li>Increasing of urbanized area but leading to waste water, higher density, and traffic</li> <li>Road width from 7m to 10m within 6 years</li> <li>Land price from 0.4 million THB/rai to 3~4 million THB/rai</li> </ol> </li> <li>Community development direction               <ol style="list-style-type: none"> <li>Need participation from residents of GHP</li> <li>Create more urbanization area</li> <li>Improve quality of environment and physical facility</li> <li>Make more short cut to reduce traffic</li> </ol> </li> </ul>

Nevertheless, local governmental officer<sup>4</sup> (Khlongsam Sub-district Administrative Organization (SAO) of Khlongsam, 2012) has different attitude from private sector, they can indicate advantages and disadvantages of GHP. Because the main responsibility of local government is to maintain and improve quality of living for everybody in the district, they need cooperation from citizen, including inside and outside GHP, to create appropriate development plans for district. This organization is a part of decentralized administrative system from central government and described below;

This presents that SAO has to take responsibility on whole sub-district area, which is divided into smaller 16 zones. Each zone has ‘village headman’ as a zone leader to coordinate between five types of community, located in the same zone, and SAO. Citizens who live outside GHP are under the direction of village headman. In other words,

<sup>4</sup> Mr. Charoon Promsoongwong, Civil division of Khlongsam Sub district Administrative Organization (SAO), interviewed 15<sup>th</sup> August 2012.

FV and IH have the same community leader, while GHP-D, GHP-T, and HP have their own leaders project by project as 'juristic person'. The juristic person plays in role as a representative of residents inside GHP. Therefore, this presents void of connection between local government and GHP's residents; it lead to non-continuation of district management by local government. This sense affirms importance of strength of community through social relationship empowerment. Currently, local government strives to hold public activities to gather inhabitants, such as, voluntary for self-security and traditional or religious events. Nevertheless, there is less cooperation from whole number of citizen. The participants consist of 70% of residents outside GHP and 30% of residents inside GHP. In addition, local government also intends to support self-economy of citizen via training career program. These kind of activities aim to promote strength of community and better living of residents, but lack of collaboration from residents (Figure V-11).

The critics of GHP's effect are mentioned that GHP leads to poor quality of environment; water pollution in canals, destruction of main roads surface, at the same time, they can motivate local economic through increasing demand of commercial area. However, this growth also brings consequences such as drugs, crime, and traffic jam. The interviewee also described more about the difficulty of the whole public development in this area, which is the lack of participation from all communities and inadequate infrastructure and facilities to support newcomer and former villagers in the future. Although, local government recognizes current problems and situation in study is the priority of ideas to keep focusing on physical improvement, particularly infrastructure to response to the rapid urbanization.

## **5.5. Findings and Conclusion**

### **5.5.1. Physical Environment in district**

According to evidences revealed above, the characteristics of physical environment of Khlongluang district can be summarized follow;

(1) Land plots are geometric form regarding by man-made typology of canal system and land allocation since canal excavation project began. That canal system created grid patterns of geography.

(2) Road system is built in parallel with canal system. Thus the accessibility of former villages has remained until these days. The improvement of road network is expanding width of roads and upgrading material of road's surface.

(3) Land use transformation has been emerged rapidly through encroachment of gated housing projects. Former villagers had to move diffusely to designate lands by landowners. Those prior paddy fields turned into residential projects. There are no agricultural activities in this area as well. This transformation can be called 'the



replacement of land use’.

(4) Most of residents are low to middle class; income is range from 10,000 – 30,000 THB.

### 5.5.2. Characteristics of 5 types of communities and neighborhood relationship

Moreover, we revealed characteristic and different neighborhood relationship of five types of community in study area as follows;

**Table V-12: Significant characteristic related with inside and outside relationship**

Inside Relationship	FV	GHP-D	GHP-T	HP	IH
Common attractive activities	Traditional and Voluntary	Traditional, Voluntary, and Community meeting	Traditional and Voluntary	Traditional	Traditional
Low attractive activities	-	Sport	Community meeting or Never participation	Community meeting and Sport	-
Participants	Only inside members	Anybody			
Inside Perception	Friendly neighbors	Safety (Similar percentage as others)		Friendly neighbors	Friendly neighbors
Number of friends	6 – 10 persons	6 – 10 persons	0 – 5 persons	0 – 5 persons	6 – 10 persons
The way to interact	Neighbors who live nearby their houses				
Frequency of social interact	Almost everyday				
Community Bond	Neighborhood is important	Proud to live here			Like my neighbors
Overall Inside Relationship	3.26	2.86	2.93	3.07	2.64
Outside Relationship	FV	GHP-D	GHP-T	HP	IH
Frequent activities and places	Buying food (at market)				
Number of outside activities	5.89	4.29	4.56	5.17	4.34
Motivated Reasons	Facing problems	Having public mind	Facing problems	Having public mind	Having public mind
Segregated elements	No effect	Common facility inside GHP	High fence and gate	Common facility inside GHP	Common facility inside GHP
Outside perception	2.22	2.12	2.19	2.26	2.17
Overall Outside Relationship	4.35	3.95	3.76	4.19	3.84

#### 1) Former village (FV):

Villagers have been in this area for 18 years, which seems to be local community of this district. Major occupation is governmental officers; this can affirm former villagers already stop being agriculturists through reduction of paddy fields. The longest period of living in this area makes villagers having high emotional connection with site. That makes high strength of community as previous study’s findings. Although they are

active persons to interact with neighbors, they behave like a closed community. FV's respondents also seem to accept the threat from GHP because the elements of GHP could not effect on social segregation. This assumption is also supported by good outside relationship on surrounding as shown in Table V-12, although they are enclosed by fence of GHP.

#### 2) Gated Housing Project with Detached houses (GHP-D):

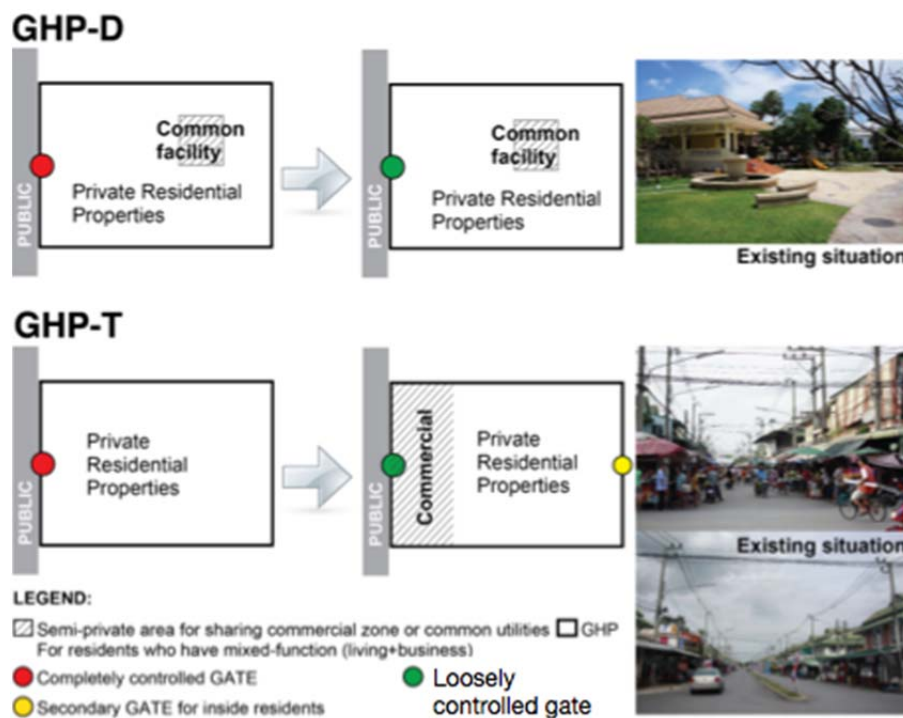
Most of respondents face traffic congestion because of longer average time to go to work than others. This evidence can validly confirm traffic problems in this area. Although GHPs' environment is provided good quality in common space and amenities, around a quarter of respondents are still facing problems in living and lost sense of safety. It is affirmed through their lowest perception to outside communities. This may effect from loosely controlled gate to share common inside facilities (Figure V-7). Gates and amenities, which are principal elements of GHP, still are important for perception of residents in GHP-D. This makes the residents feel social segregation from surrounding communities. Most of residents in GHP-D rely on their neighbors; hence, the neighbors can be effective influencers to enhance social relationship inside community.

#### 3) Gate Housing Project with Townhouse (GHP-T):

As physical observation, area that is nearby the main gate of GHP has been modified to be commercial zone (Figure V-7) and additional secondary gate. This zone provides temporary food market and local service. The residents who live in this zone are shopkeepers or business owner. The townhouse units are adapted for commercial activities. Moreover, these activities also motivate local business of district that confirmed by interview of local government. The situation of loosely controlled access leads to disadvantages such as lacking of sense of safety. This result refuses general understanding about GHP that can provide high security. Consequence, it leads to weak outside relationship. However, this mixed-use area also creates convenience for inside residents, and creates more opportunities for social interaction through business activities. The behavior of GHP's residents is lack of cooperation, interaction, and mindedness (Table V-13). Most of residents have never participated public events because they prefer only attractiveness of activities such as traditional or religious activities. These findings are expected to create the way to improve social relationship that is appropriate with respondents' behavior.

**Table V-13: Nature of GHP in Pathumthani case**

Characteristics	GHP-T	GHP-D
Behavior	No cooperation, Less Interaction, No mindedness, and Having passive neighbors	Less interaction, Non-mindedness, and Having passive neighbors
Active activities	Traditional and Religious activities	Traditional and Religious activities Community meeting
Reinforcer for social improvement	Neighbors and Respondents' personality (socialized)	Neighbors and Respondents' personality (socialized)
Effect from Loosely controlled gate	Perception on safety in not better than other types of communities (under expectation) Increase more chances to make social interaction through sharing common facilities and commercial activities inside GHP	
Segregation	A little bit opened community	Quite solitary community
Physical condition	Adapted GHP (Loosely controlled gate, Secondary gate, Commercial area)	Adapted GHP (Sharing common facilities with outsiders)



**Figure V-7: Adapted GHP in Pathumthani**

#### 4) Housing Projects without gates (HP):

Around half of respondents in HP are company officers, which their workplaces are in Pathumthani. They have occupied in this area almost a decade. The size of household becomes bigger because they move from shophouses to detached houses or townhouses. Moreover, they decided to live in this community because of good quality of inside environment and reasonable price of housing units. They think inside amenities of community have effect on social segregation. In terms of neighborhood relations of respondents, they have low belief in community's capability, thus, they are very glad to

see someone support their communities. Although, neighbors visit them almost everyday, they have few friends in community. However, they have the highest perception to outside community because of non-controlled gates. Then, they become semi-opened community.

5) Individual house (IH):

The size of household in IH is the biggest among five types of community. Most of residents work at home as shopkeepers and freelancers, but one third of respondents are private company officers working in Pathumthani and Bangkok city. They have expanded households from shophouses to townhouses or detached houses because of reasonable price of dwelling units. Even if their communities have no clear boundaries, they have many friends and like neighbors. Additionally, they have rather strong bond of community because they have conformity between group and members. However, the total inside neighborhood relationship is still the lowest. They also prefer to join voluntary activities that reflects regarding on common activities and public area. This is why IH is opened community and being the second highest outside relationship.

According to findings of outside relationship, the common interesting activities and places might be promoted to enhance outside relationship among different types of community. The results show buying food at the market is the most frequently activities of every community, therefore, the market area should be provided spaces for sharing common activities such as traditional events. The ideas of the way to enhance social relationship inside and outside community will be clarified in Chapter 8.



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## CHAPTER VI

### Neighborhood relationship assessment in Residential area, with disorder GHP settlement in Nonthaburi province

#### 6.1. Introduction

The pattern of residential land distribution is as a key to clarify the actual impact of GHP development in term of social assessment in specific area. Nonthaburi area has the highest migration in the past decade and totally different residential land distribution from Pathumthani area; namely, the composition of lands became more complicate and disorder according by natural canal network. This situation led to existing communities isolation by GHP's physical elements and locations.

Therefore, this chapter focuses on problems of GHP development in the disorganized residential land distribution that unavoidably affected on people who live inside and outside community in neighborhood relationship by different physical environment in community and urban scale. Through questionnaire distribution, empirical observation, and stakeholders interview as supportive method are included in neighborhood relationship assessment, the impact of GHP can be illustrated.

The social interaction assessment of this chapter is conducted with two methods (Figure VI-1); firstly, we study background of study area to understand physical environment and existing situation in Nonthaburi area via field survey. Then, we found five types of existing community and scope of area that should be investigated. Secondly, the structured questionnaires are distributed face-to-face to residents in selected communities, and to clarify neighborhood relationship inside and outside communities. The results came from questions that assessed inside sense of community and residents' behavior to go outside community that were evaluated via SPSS program as statistic calculation. Next, formal interview are used to obtain perception of municipality officers and developers. Additionally, a non-structural conversation is inquired to residents during site survey as supportive results. In summary, all results will be discussed about different social interaction in all types of community in Nonthaburi area, and proposed some suggestions for new GHP in the future.

## 6.2. General overview of Bangyai district, Nonthaburi province

**Table VI-1: Population growth in BMR**

(Source, [http://stat.dopa.go.th/xstat/pop55\\_1.html](http://stat.dopa.go.th/xstat/pop55_1.html), \*Ministry of Agriculture and Cooperation, 1998)

Province in BMR	Area** (km <sup>2</sup> )	Population**(persons)		Density** (pp/km <sup>2</sup> )	Population growth	Ratio*(1998) Agricultural/total area
		2004	2012			
Bangkok	1,568.737	5,6341,132	5,673,560	3,616.64	+ 0.7%	0.14
Nakhonpathom	2,168.327	789,016	874,616	403.36	+ 9.6%	0.51
Nonthaburi	622.303	942,292	1,141,673	1,834.59	+ 21.2%	0.22
Pathumthani	1,525.856	769,998	1,033,837	677.55	+ 34.3%	0.46
Samuthprakarn	1,004.092	1,049,416	1,223,302	1,218.32	+ 16.7%	0.09
Samuthsakhon	872.374	442,687	508,812	583.27	+ 14.9%	0.26
TOTAL	7,761.662	9,636,541	10,455,800	1,347.11	+ 8.5%	

Among five vicinity areas in BMR, Nonthaburi province is an area where urbanization is rapidly proceeding. Its population density is in the highest rank of all vicinities (1,834.59 pp/km<sup>2</sup>), while ratio of agricultural land use was not so small as 0.22 in 1998 (as shown in Table VI-1). The population growth of Nonthaburi province is the second rank of BMR (+21.2%). One of the reasons of this increase might be the relocation of 29 governmental organizations to Nonthaburi government center between 2007-2013. This situation might effect on residents' profile in district. Thus, new residential development is highly possible to have an impact on existing agricultural area.

The population of Nonthaburi province, which has an area of 622.3 km<sup>2</sup>, was 1,141,673 in 2012. The study area for field survey was Bangyai district with the highest migration rate in Nonthaburi province, which was +9.10% in 2011). The area of Bangyai is 98.398 km<sup>2</sup>, and its number of household in 2012 was 58,045 families (Klinmalai and Kanki, 2013). The agricultural land was approximately 48% of total area but agrarian households were 6.8% of whole families in Bangyai district. This situation reflects comprising of a mosaic of urban and rural land uses.

When the city started to rapidly modernize during King Rama IV - V, the civilization has been applied to polity, culture, and also urban development. During this era, the western townscape influenced on urban development in Bangkok, especially road network. The former roads were used for carriages and carts; hence they were made from soil and mud. Beginning on usage of cars was in late King Rama V era (1880), quality of roads were improved and spread to perimeter of city.

Formerly, this area was cultivated land and characterized by a dense canal network (Figure VI-1(D)). Canal excavation was necessary for irrigated rice cultivation and water transport, which was the only transportation method, because the canals were part of continental Chaopraya delta (Figure VI-1(D)). Many

farmers and agriculturists who became original local people in this area have migrated from Ayutthaya province since 14th-18th Century to cultivate paddy fields and orchards alongside the canals. The alongside area of canal was utilized for planting and setting down their houses. Since modern infrastructure was spread from Bangkok city, such as, bridge and highway, the population and housing rate have been increased. Many fields have been urbanized to be residential area, new housing project developments (GHP), and located on the main road. However, these agrarian developments continue to influence land-use pattern after urbanization, resulting in a complex mosaic of rice fields, orchards, and residential land uses (Figure VI-1(A)). This also creates free-form plot shape of GHP following agricultural configuration. The consequences of this situation possibly impact on environmental and social aspect of residents in GHPs and former villagers.

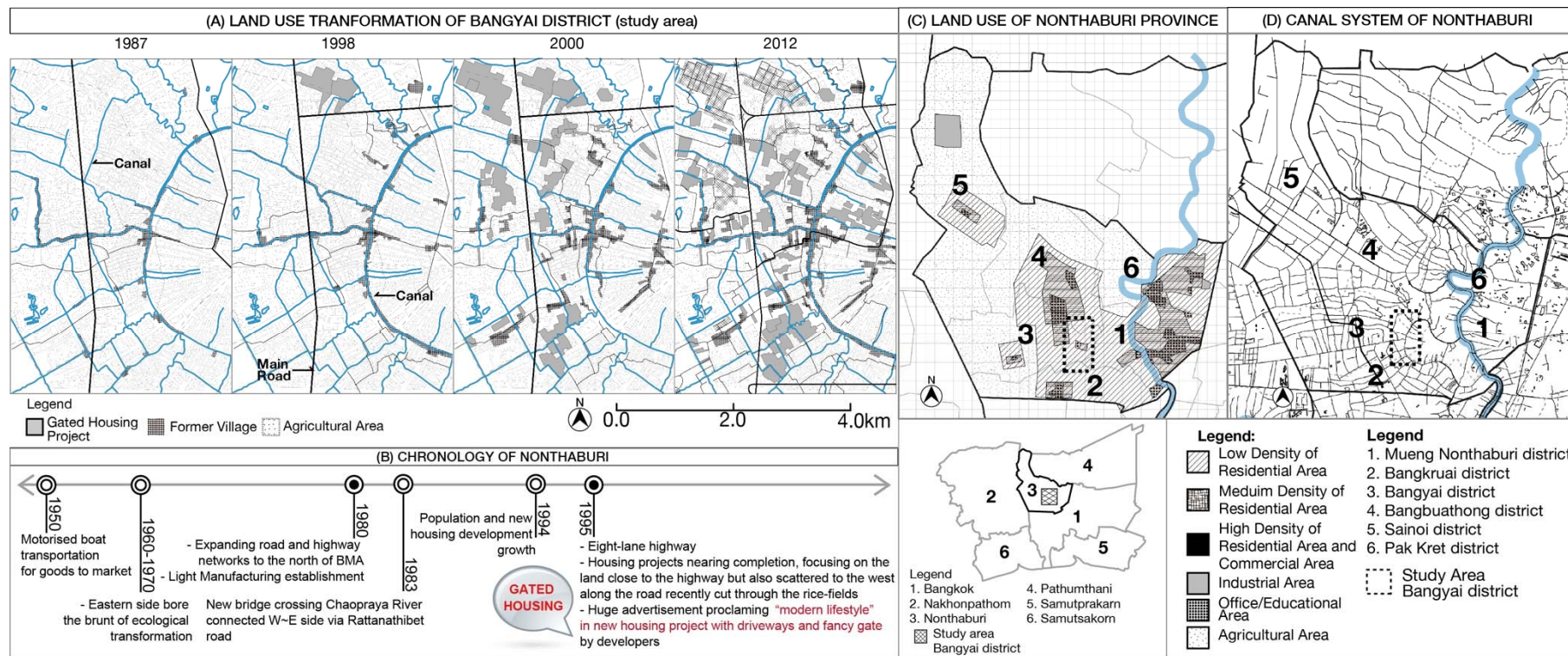


Figure VI-1: Land use and canal system of Nonthaburi province

(Source: author, 2013)



### 6.2.1. Residential Development in study area

In study area, there are five different types of community including; former village (FV), gated housing project with detached house (GHP-D), gated housing project with townhouse (GHP-T), housing project without gate (HP), and individual house (IH). They disorderly located in between agricultural fields. This land use pattern transformed the complex mosaic and disorder plots as shown in Figure VI-2. In the physical observation, we found some main accesses of FV connected to the canal, while other communities faced to the road. The road network system does not conform to canal system, especially, the highway that past the north to the south cut off the connection between streets in eastern and western side of study area.



(A) Individual House (IH)



(B) Housing project without gate (HP)



(C) Gated Housing Project with Townhouse (GHP-T)



(D) Gated Housing Project with Detached houses (GHP-D)



(E) Former Village (FV)

**Figure VI-2: Five types of community in study area**

(Source: author, 2013)

When we considered the master plan in Figure VI-4, FV and IH seems to be unintentionally enclosed by walls of GHP-D, GHP-T, or HP. Consequently, it is rather difficult for FV's residents to keep using water transportation as their main accesses because the canal was too shallow. The characteristic of GHP-D and GHP-T is similar, namely, having only gate, enclosing with a solid wall all of projects, and providing common space for inside residents. While HP is a mixture of residential type and also constructed by developer like GHP, but its gate was eliminated and security control removed by residents' agreement. Because they could not support whole maintenance cost of common space and amenity inside the project, then the common corridor of project was devoted to local government. Many blocks of townhouse in HP are commercial function; hence, eliminating the gate supports this business activity. The individual houses (IH) are detached houses located as a fragmentary cluster along the road with their own fence of housing unit. It is difficult to define clear boundary of community.

Because of private property permission, it was difficult to gather all 400 questionnaires. For instant, the questionnaires could not be distributed directly to respondents in GHP-D and GHP-T, GHP's juristic committee was as a presenter of us to spread the question sheets. In this situation, only 347 questionnaires were collected in different types of community (Figure VI-3). Therefore, the study results were displayed in percentage of answer in each question or chosen choice to be able to compare and analysis between different types of community in next chapter.



(1) Former Village (FV) = 44

(5) Independent House (IH) = 54

(2) Gated Housing Project with Detached house (GHP-D) = 56

(3) Gated Housing Project with Townhouses (GHP-D) = 27

(4) Housing Project without controlled gate (HP) = 54

**Figure VI-3: Characteristic of Gated housing project and Land composition**

(Source: author, 2013)



### 6.2.2. Current situation and problems

Although, we cannot prohibit this phenomena immediately, but urban planners and researchers keep seeking how to reduce its impacts, especially on quality of living of residents. The effects of sprawl development are broadly investigated as well. The main mutual impacts of urban sprawl are shown in Figure VI-4.

### 6.3. Questionnaires survey for inside and outside communities

As objectives of the first part of questionnaire aims to examine individual characteristic of respondents in each community, the primary results from questionnaires were analyzed through descriptive statistic calculation such as frequency, percentage, and means as quantitative analysis. Moreover, the behavior of respondents also is examined and supports the revealed The next section intends to evaluate social effect on neighborhood relationship both inside and outside residents of GHP development. The chosen answers are displayed in bar chart to compare different percentage of opinion among five communities.

#### 6.3.1. Characteristic of respondents in case study area

The background of respondents in five types of community is explored through questions in Part 1-2 of questionnaire. The results are shown in Table VI-2.

1) Former village (FV): We revealed background of residents was different, for instant, the average period of dwelling of FV was extremely longer than others. Because most of FV were born in this area and have been here for 30 years, it could be assumed that FV is the real local people who are belonging to this area. This question can reflect sequence of community settlement in district. Around 46% of FV are shopkeepers and running their own business at home. Additionally, their average income is lower than 30,000 THB per month.

2) Gated Housing Project with Detached houses (GHP-D): Respondents in GHP-D are newcomers who concern about affordable housing price nearby their workplace, and have few family members. The majority of occupation is governmental officers in Nonthaburi province. Their income is dramatically higher than other types of community. The income is over 70,000 THB. This leads to a big gap of social class that easily brings about heterogeneity in district scale.

3) Gate Housing Project with Townhouse (GHP-T): The respondents in GHP-T have been here for 10 years and work as governmental officers in Bangkok city. Their income is low to middle. They choose accommodation in this area because of appropriate size of housing units. They seem to be familiar with living in townhouses.



(A) Traffic congestion on highway



(B) Expansion of skytrain



(C) Risk of transportation



(D) Free market at local governmental office



(E) Poor environment in former community



(F) Former villages front to canal



(G) Gate of GHP-D



(H) Agricultural products business



(I) Orchards next to GHP



(J) Decaying paddy field behind GHP



(K) Obstruction of FV's accessibility and poor road surface

**Figure VI-4: Problems during Physical Observation**

(Source: author, 2013)

**Table VI-2: Characteristic of Respondents in Bangyai district**

Part 1: Background of Respondents						
Total 347	FV	GHP - D	GHP - T	HP	IH	Total
Age (yrs)	Mean: 48.71 (N=41)	Mean:40.25 (N=55)	Mean:35.45 (N=22)	Mean:38.88 (N=181)	Mean:35.31 (N=48)	Mean:39.55 (N=347)
	Std. 15.865	Std. 10.251	Std. 10.600	Std. 13.739	Std. 8.085	Std. 13.161
Family member (persons)	Mean: 4.35 (N=37)	Mean: 3.72 (N=43)	Mean: 4.11 (N=19)	Mean: 3.93 (N=167)	Mean: 5.18 (N=45)	Mean:4.14 (N=311)
	Std. 1.932	Std. 1.161	Std. 1.761	Std. 1.602	Std. 2.579	Std. 1.823
Time to go to work (mins)	Mean:31.82 (N=11)	Mean: 39.34 (N=38)	Mean:36.92 (N=13)	Mean: 33.04 (N=67)	Mean:19.45 (N=33)	Mean:31.98 (N=162)
	Std. 32.655	Std. 22.636	Std. 18.989	Std. 23.061	Std. 17.813	Std. 23.224
Period of dwelling (yrs)	Mean:30.53 (N=36)	Mean: 5.68 (N=53)	Mean:10.00 (N=21)	Mean: 9.14 (N=169)	Mean:19.00 (N=46)	Mean:12.40 (N=325)
	Std.19.921	Std. 9.131	Std. 18.921	Std. 7.506	Std. 12.944	Std.13.668
Occupation (%(N))	N =38	N =54	N =23	N =179	N =50	N = 345
Government officer	20.5% (8)	<b>42.6% (23)</b>	<b>30.4% (7)</b>	<b>12.8% (23)</b>	<b>40.0% (20)</b>	23.5% (81)
Company officer	0.0% (0)	13.0% (7)	26.1% (6)	16.8% (30)	14.0% (7)	14.5% (50)
Business owner	2.6% (1)	33.3% (18)	21.7% (5)	17.3% (31)	6.0% (3)	16.8% (58)
Shopkeeper	<b>46.2% (18)</b>	3.7% (2)	13.0% (3)	21.8% (39)	20.0% (10)	20.9% (72)
Freelance	2.6% (1)	3.7% (2)	8.7% (2)	18.4% (33)	4.0% (2)	11.6% (40)
Other	28.2% (11)	3.7% (2)	0.0% (0)	12.8% (23)	16.0% (8)	12.8% (44)
Workplace (%(N))	N = 38	N =54	N =23	N = 171	N = 50	N = 336
Bangkok city	13.2% (5)	40.7% (22)	<b>52.2% (12)</b>	22.2% (38)	16.0% (8)	25.3% (85)
Vicinity (Nonthaburi)	23.7% (9)	<b>48.1% (26)</b>	39.1% (9)	26.9% (46)	<b>74.0% (37)</b>	37.8% (127)
Work at home	<b>52.6% (20)</b>	7.4% (4)	4.3% (1)	<b>39.2% (67)</b>	8.0% (4)	28.6% (96)
Unemployed	10.5% (4)	3.7% (2)	4.3% (1)	11.7% (20)	2.0% (1)	8.33% (28)
Income (%(N))	N =39	N =54	N = 23	N =176	N =49	N = 341
Under 10,000 B.	28.2% (11)	3.7% (2)	4.3% (1)	13.6% (24)	20.4% (10)	14.1% (48)
10,001 – 30,000 B.	<b>43.6% (17)</b>	24.1% (13)	<b>65.2% (15)</b>	<b>50.0% (88)</b>	<b>55.1% (27)</b>	46.9% (160)
30,001 - 50,000 B.	12.8% (5)	24.1% (13)	21.7% (5)	19.9% (35)	14.3% (7)	19.1% (65)
50,001 – 70,000 B.	7.7% (3)	11.1% (6)	8.7% (2)	8.5% (15)	6.1% (3)	8.5% (29)
Over 70,000 B.	7.7% (3)	<b>37.0% (20)</b>	0.0% (0)	8.0% (14)	4.1% (2)	11.4% (39)
Mean	2.23 (Low)	3.54 (High)	2.35 (Low)	2.47 (Low)	2.18 (Low)	2.56
Std.	1.180	1.313	0.714	1.085	0.972	1.178
Legend:	1.00 – 1.49 = Very Low 3.50 – 4.49 = High		1.50 – 2.49 = Low 4.50 – 5.00 = Very High		2.50 – 3.49 = Average	
Part 2: Residential unit background						
	FV	GHP - D	GHP - T	HP	IH	Total
Previous dwelling (%(N))	N = 36	N = 68	N =78	N =41	N =69	N = 292
Detached house	<b>63.9% (23)</b>	<b>66.2% (45)</b>	15.4% (12)	26.8% (11)	17.4% (12)	35.3% (103)
Townhouse	5.6% (2)	5.9% (4)	<b>35.9% (28)</b>	12.2% (5)	7.2% (5)	15.1% (44)
Apartment	8.3% (3)	13.2% (9)	17.9% (14)	19.5% (8)	7.2% (5)	13.4% (39)
Shophouse	19.4% (7)	11.8% (8)	26.9% (21)	<b>36.6% (15)</b>	<b>62.3% (43)</b>	32.2% (94)
Semi-detached house	2.8% (1)	2.9% (2)	3.8% (3)	4.9% (2)	5.8% (4)	4.1% (12)
Why you live here (Multiple choosing)						
Near Workplace	12.1%	17.6%	17.5%	<b>23.4%</b>	<b>30.9%</b>	
Affordable price	6.1%	<b>18.5%</b>	17.5%	14.9%	7.4%	
Good design and material	3.0%	7.6%	0.0%	2.3%	1.5%	
Proper Size	9.1%	16.8%	<b>22.5%</b>	8.4%	7.4%	
Credible Developer	0.0%	5.0%	2.5%	1.1%	1.5%	
Good Environment (inside community)	3.0%	9.2%	5.0%	1.5%	2.9%	
Good Environment (outside community)	1.5%	8.4%	7.5%	5.7%	1.5%	
Lively community	12.1%	6.7%	10.0%	6.1%	11.8%	
Near public facility	10.6%	5.0%	12.5%	14.9%	4.4%	
As my birthplace	<b>21.2%</b>	1.7%	0.0%	1.5%	19.1%	
Being agriculturists who lived here	4.5%	.8%	0.0%	5.4%	5.9%	
Family move in	12.1%	0.0%	2.5%	6.5%	2.9%	
Other	4.5%	2.5%	2.5%	8.0%	2.9%	
Legend: FV = Former Village    GHP-D = Gated Housing Project (Detached house)    GHP-T = Gated Housing Project (Townhouse)						
IH = Individual House    HP = Housing Project without Gate    N = Number of respondent						

4) Housing Projects without gates (HP): Around a quarter of respondents in HP are shopkeepers, who work at home. They have occupied in this area for almost a decade. They are low to middle income. They choose to live here because they saw business opportunities. The characteristic of community, which has no restrict access, supports their business.

5) Individual house (IH): The residents in IH have been moved as the second community (19 years ago). The size of household in IH is the biggest among five types of community. They have expanded households from shophouses to townhouses or detached houses, and migrate to live here because of nearby their workplaces. The size of household in IH is the biggest families who are the second group of migrant. They moved to this area because of workplace location, around 40% of IH people are government officers who take time to work just 20 minutes to work in Nonthaburi area.

Previous dwelling type shows that HP's respondents have expanded size of household from shophouses to detached houses (as shown in Figure VI-3), while others are familiar with the same type of housing unit. Their main criterion of choosing residential place is an appropriate size (22.5%) but HP's residents concern about workplace location (23.4%). These results from part 1 and 2 of questionnaires show the dissimilarity of characteristic of residents in different type of community. Moreover, they also illustrate some relationship between characteristic and physical residential type.

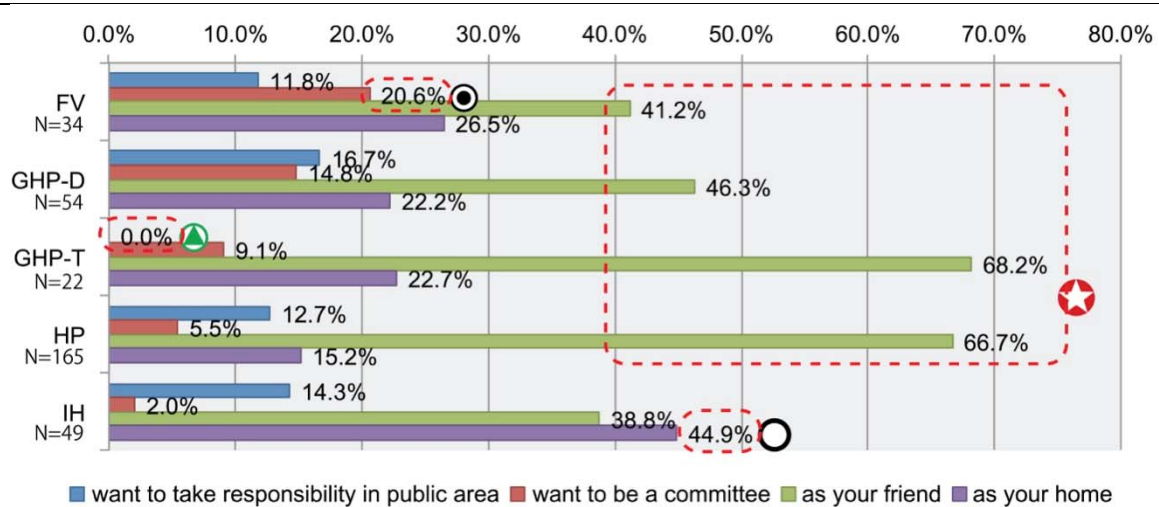
### **6.3.2. Evaluation of Neighborhood relationship**

After characteristic of respondents are explored in previous section, this section will evaluate neighborhood relationship through different types of community. The number of chosen answers is calculated in two formats; mean and percentage, according by questions and answers. The satisfaction and perception of respondents are shown in average of means, while another are exhibited in percentage of number of chosen answers. Results of neighborhood relationship are displayed from Table VI-3 to VI-9.

Neighborhood relationship inside community was conducted by questions in part 3 of questionnaire, which questions asked respondents' agreement. The results from evaluation can be shown overall inside - outside neighborhood relationship and behavior of respondents in each type of community.

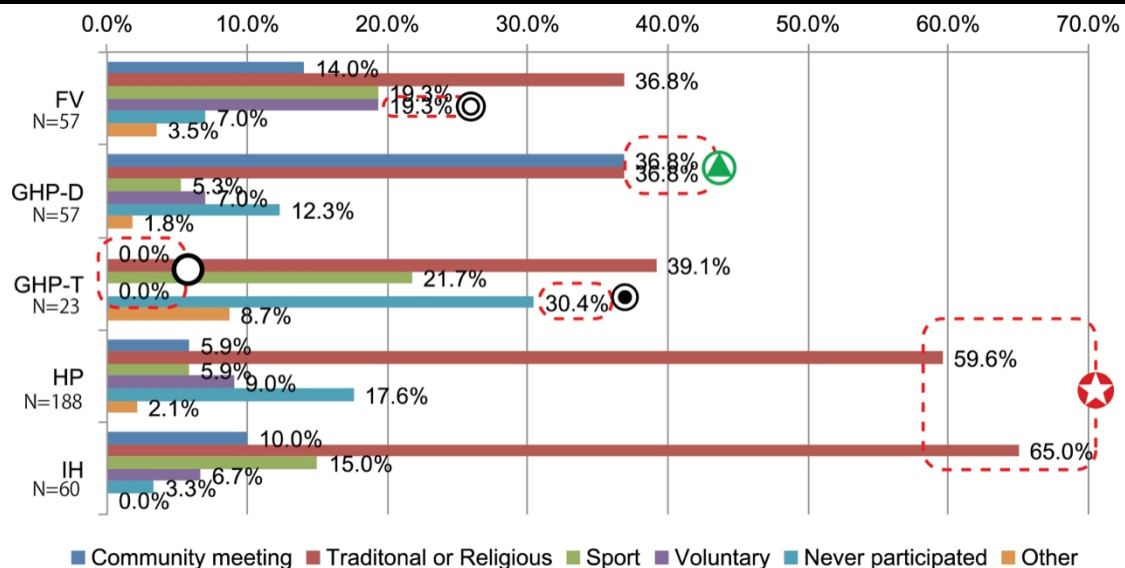
Membership factor (MBS) reflects sense of feeling as part of group through inside community participation and perception. As literature review in Chapter IV, membership of residents will be expressed through their actions in public area or community. Thus, evaluation of membership consists of three aspects: to evaluate actions on community, to investigate their participations, and to clarify closeness of community via kind of participants.

**Table VI-3: Answers of Membership's questions in bar chart of percentage**



### 3.1 Your perception on community

FV, GHP-D, GHP-T and HP have similar agreement that neighbors are as their friends; 68.2% and 66.7% respectively ★. This result shows their neighbors become a part of group. That means respondents in FV, GHP-D, GHP-T, and HP concern about neighborhood. Choice of 'want to take responsibility in public area' and 'want to be a committee' reflects mindedness on inside community. FV's respondents want to play a role in committee of community around 20.6% ●. Although the IH has outstanding result of feeling as your home; it is 44.9% of respondents ○. ▲ No respondents in GHP-T want to take responsibility in public area.



#### 3.2.1 What's kind of inside activity you often participated? (multiple choose)

Over half of respondents ★ in HP and IH frequently join traditional activity as the most popular event of every type of community. Because GHP-D has system of management in community, they often attend the community meeeting (36.8%) ▲. FV's respondents have notable results to be volanteers that means FV concerns about public more than others ●. Contradictory, 30.4% of respondents in GHP-T have never attended community's activity ●. Community meeting and



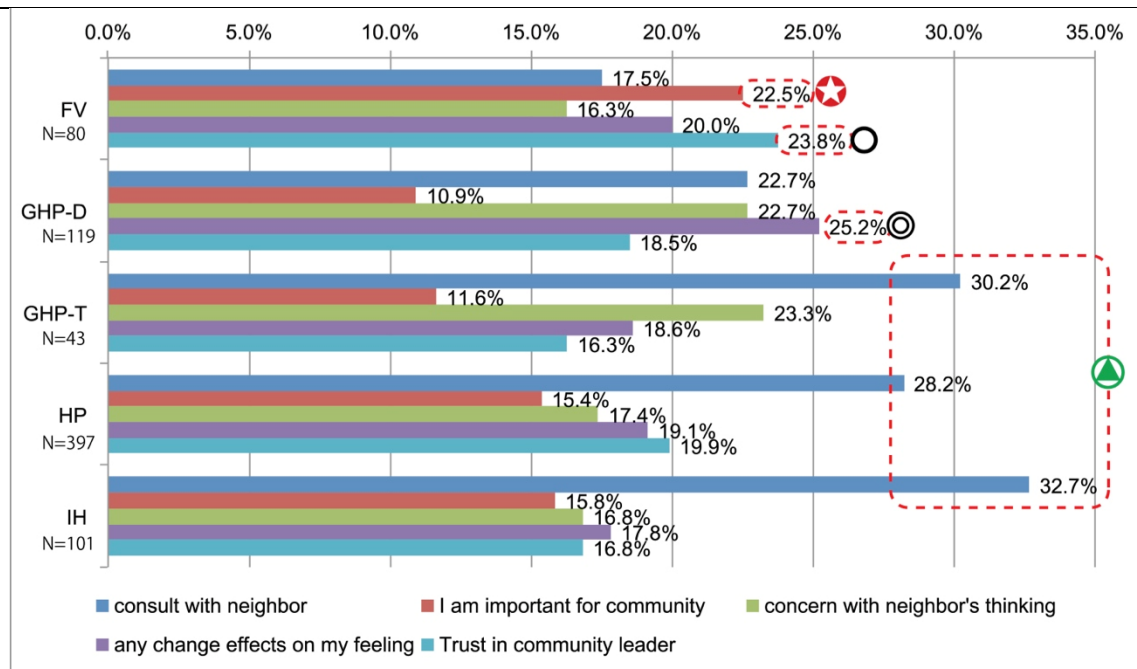
sport cannot gather respondents in GHP-T to join ○.



### 3.2.2 Who is participant you would like to join with?





● The most opened community is GHP-T and HP because around half of respondents desire to participate event with anybody. Almost 50% of FV and GHP-D is also agree as same as GHP-T and HP. 22.6% of respondents in GHP-D behave as closed community ▲ that are higher number than others. FV and IH have higher cooperation with local governmental officers (39.4% and 44.9% ★).

Table VI-4 Answers of Influence's questions in bar chart of percentage



### 3.3 Influence: Your sense that matters to community and the community can influence you (multiple choose)

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Around 30% of respondents  in GHP-T, HP, and IH prefer to take advises from neighbors. FVs  trust in community leader more than other types of community. In addition, 22.5% of FVs  dramatically feels that they are important for community. That means members in FV influence on community or group. A quarter of respondents in GHP-D  concern about a change within community. This reflects respondents in GHP-D care about situation inside community

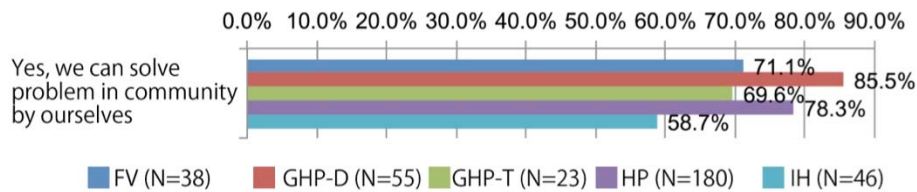
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The opinion of influence factor (IFE) is bidirectional concept. It consists of; member to be attracted to a group, and a group's ability to influence its member. Hence, it is important to evaluate both side of concept and allow respondents to select more than an answer as shown in Table VI-4 above.

Question 3.4.1 - 3.5.3 (Table VI-5 and VI-6) refers to the feeling of integration and fulfillment of needs (FON) including: the cooperation behaviors, attitude, and satisfaction of the community. This is a primary function of a strong community because members are willing to live in a satisfied place. This part of questionnaire was composed the questions that asked about agreement and disagreement, and scale of satisfaction and feeling of respondents. Therefore, format of results are in means and percentage of chosen answers. The evaluator of FON involves: competence of capabilities of other members, attitude on success of community, perception within community, environmental satisfaction in community, and trust on other members. Table VI-6 shows GHP-D can fulfill needs of residents most in term of environment, trust, and attitude on community's improvement. On the other hand, environment in FV makes dissatisfaction on residents.

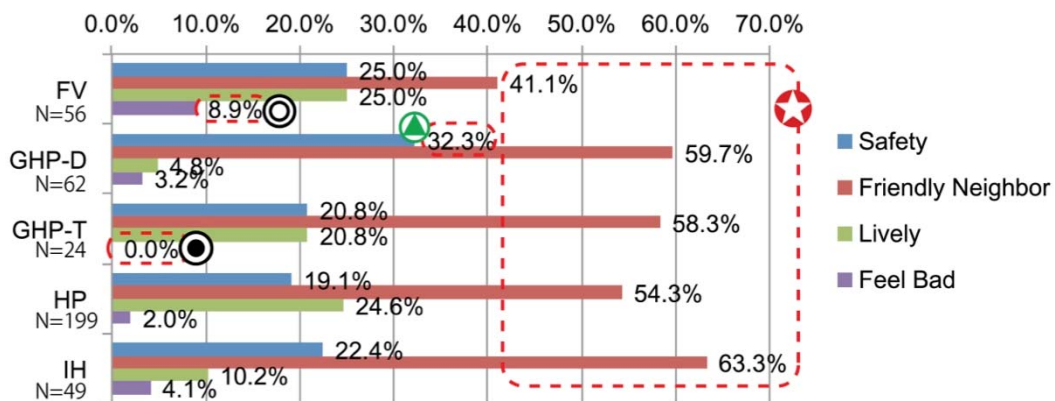


**Table VI-5: Answers of Integration and Fulfillment of Needs in bar chart of percentage**



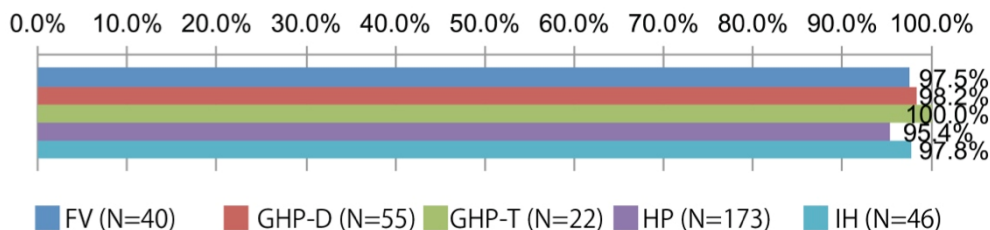
### 3.4.1 Community can address problems by themselves

Around 85.5% of GHP-D strongly believe in capability of their community.



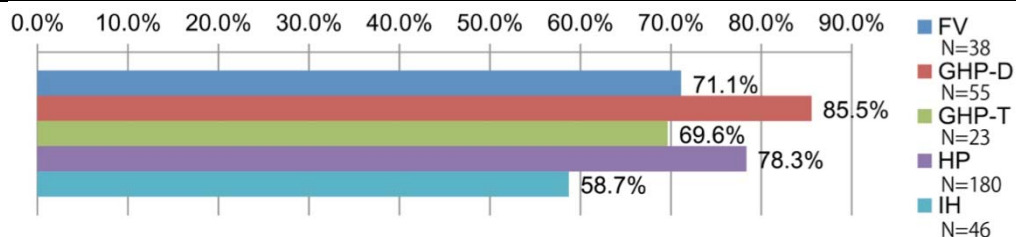
### 3.4.2 Your perception to inside community (multiple choose)

Most of respondents agree that their neighbors are friendly, especially in every type of community. 32.3% of GHP-D perceives their communities are safe that is higher than others. 25% of FV and 24.6% of HP have similar agreement that their communities are lively. It seems only FV that feel bad on inside community with higher number of answers than others (8.9%), on the other hand, no respondents in GHP-T feel bad on inside community.



### 3.5.4 Best thing for community as yours

Every respondents in GHP-T congratulate when community is improved and feel like as their own.



### 3.5.5 Housing problems

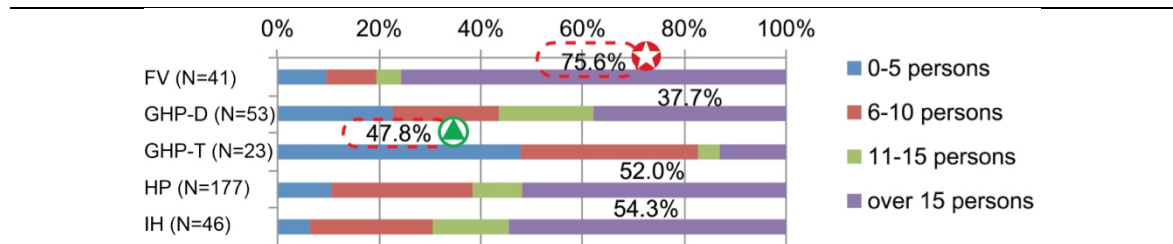
While the respondents in GHP-D and HP are facing more problems of living than others.

**Table VI-6: Means of chosen answers in FON**

Part3: Integration and Fulfillment of Needs (FON)						
Satisfactions/feeling	Former Village	GHP-D	GHP-T	HP-No gate	Individual house	Overall
3.5.1. Environmental Satisfaction	<b>Means: 2.98 (N=41) Std. 0.821</b>	<b>Mean: 3.40 (N=55) Std. 0.735</b>	Mean: 3.11 (N=19) Std. 0.737	Mean: 3.14 (N=179) Std. 0.717	Mean: 3.04 (N=48) Std. 8.085	Mean: 3.15 (N=339) Std. 0.770
3.5.2. Degree of trust to neighbor	Means: 3.15 (N=41) Std. 0.823	<b>Mean: 3.55 (N=55) Std. 0.741</b>	Mean: 3.32 (N=19) Std. 0.820	Mean: 3.30 (N=178) Std. 0.712	<b>Mean: 3.07 (N=45) Std. 0.889</b>	Mean: 3.29 (N=338) Std. 0.770
3.5.3. feeling when someone help your community	Means: 3.82 (N=38) Std. 0.766	<b>Mean: 3.90 (N=49) Std. 0.714</b>	Mean: 3.71 (N=17) Std. 0.772	Mean: 3.70 (N=166) Std. 0.773	<b>Mean: 3.42 (N=45) Std. 0.965</b>	Mean: 3.71 (N=315) Std. 0.800
Legend:	1.00 – 1.49 = Very Low 3.50 – 4.49 = High		1.50 – 2.49 = Low 4.50 – 5.00 = Very High		2.50 – 3.49 = Average	

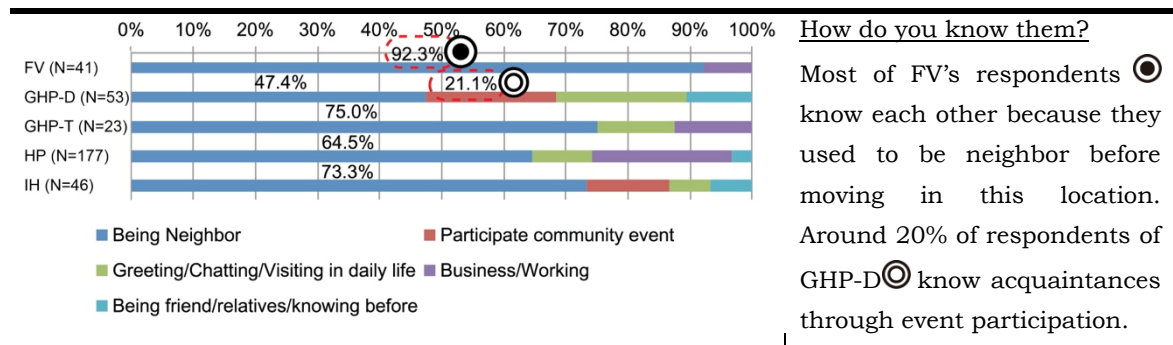
Factor of ‘shared emotional connection’ (SEC) aims to evaluate interaction of members in shared events may facilitate or inhabit the strength of the community. The series of questions can measure quality of interactions of members. The relations of number of acquaintances and friends reflect superficiality of relationship among members. For instant, when number of acquaintances is more than number of friends (Question 3.6.1-3.6.2) within community, it means the relationship of members is superficial. The frequency of members’ interaction (Question 3.6.5-3.6.6) reflects proximity. The attachment to community (Question 3.6.7) mirrors bond of community. The interdependence in community shows interpersonal emotional with other members. The results from SEC evaluation are in Table VI-7 as shown below.

**Table VI-7: Answers of Shared Emotional Connection in bar chart of percentage**



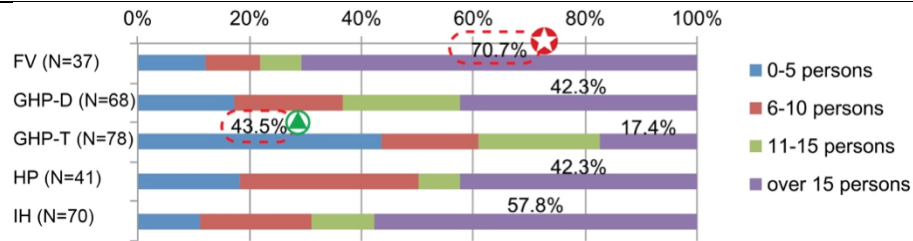
### 3.6.1 Number of acquaintances inside community

75.6% of respondents in FV<sup>★</sup> have highest number of acquaintances within community, while 47.8% in GHP-T<sup>▲</sup> has few acquaintances.



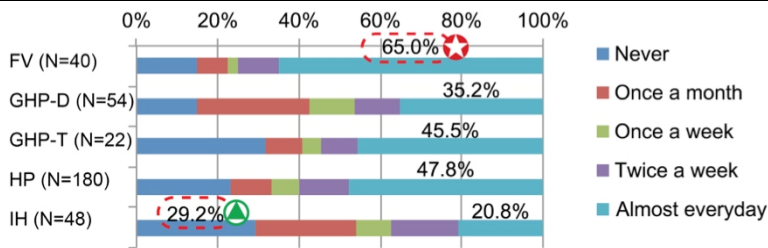
### How do you know them?

Most of FV's respondents<sup>●</sup> know each other because they used to be neighbor before moving in this location. Around 20% of respondents of GHP-D<sup>◎</sup> know acquaintances through event participation.



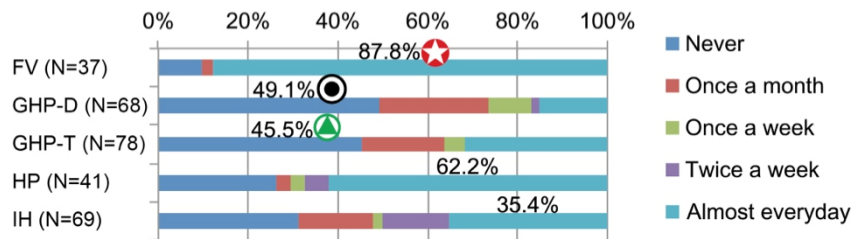
### 3.6.2 Number of friends inside community

The result is similar to (3.6.1), namely, 70.7% of residents in FV have highest number of friends but GHP-T has few friends.



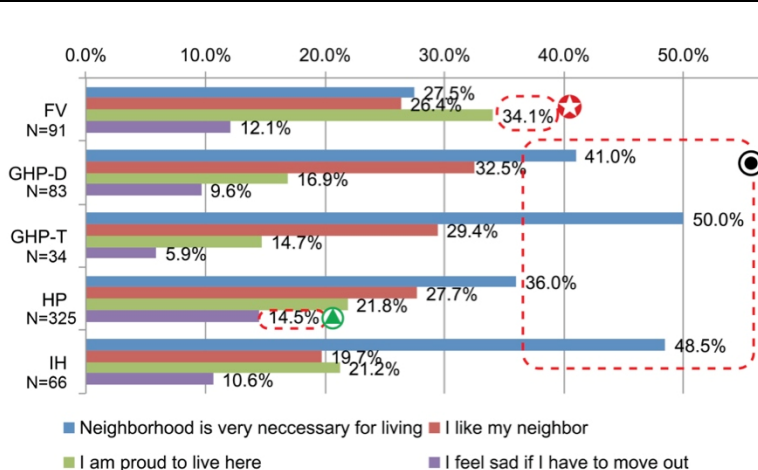
### 3.6.5 Neighbors' visiting

29.3% of respondents in IH have never visited their neighbors, meanwhile FVs always visit neighbors everyday.



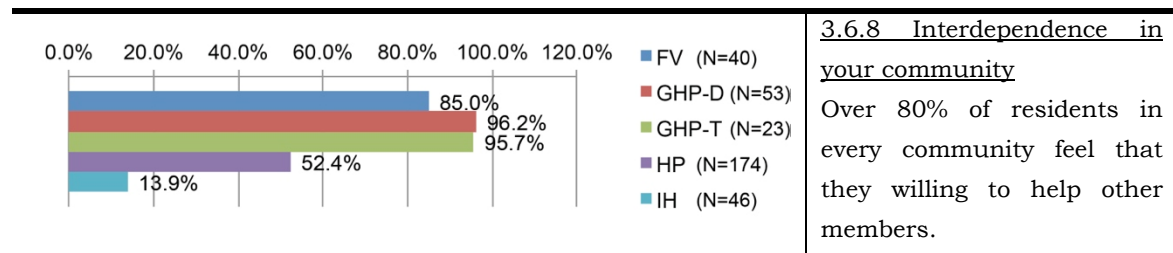
### 3.6.6 Talking to neighbors

87.8% of residents in FV always talk to their neighbors. That means FV are the most active community to interact with neighbors. On the other hand 45.5% and 49.1% of residents in GHP (GHP-D and GHP-T) have never talk to neighbors. This reduces interaction between residents and may lead to isolation inside community.



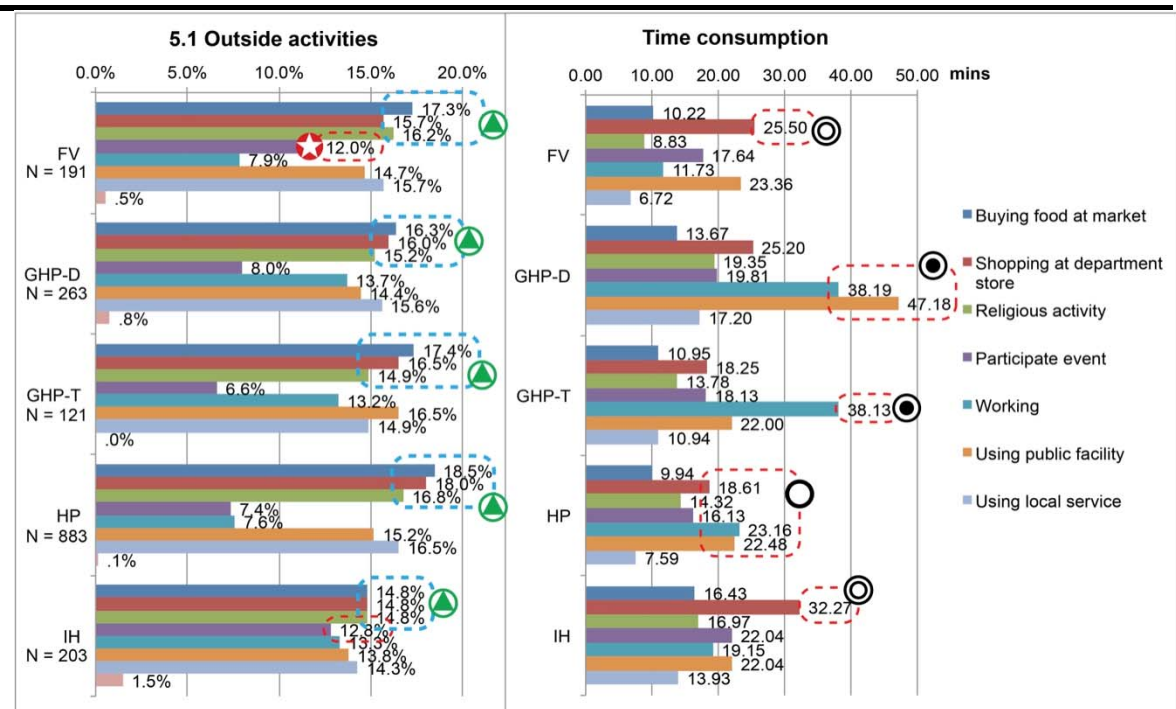
### 3.6.7 Attachment to the community (multiple choose)

Most of communities realize neighbor is important for living except FV. FV have obviously highest pride for living in this community at 34.1%. 14.5% in HP, 12.1% in FV, and 10.6% in IH, which are non restrict access community, feel sad if they have to move out. This is higher than GHP.



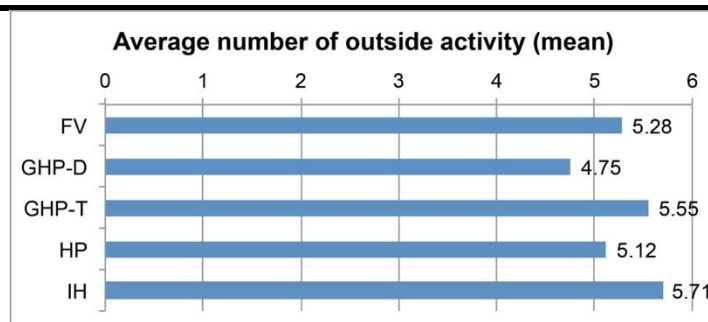
The concept of outside neighborhood relationship evaluation in this study bases on opportunity of social interaction in public area. The more numbers of outside activities they participate, the more chances of interaction they have. Number of outside activities is shown in Question 5.1. In addition, time for doing those activities is asked in order to refer distance from their locations and reflect traffic problems. Question 5.2 aimed to investigate reasons of going out to join out side event except their daily life. Because participation in crisis situation can increase bond of community, then motivation of attending public events are asked. As literature review in Chapter IV mentioned physical attractiveness could be strengthening social cohesion, question 5.3 analyzes physical elements of GHP that impact on social segregation. This inquiry emphasizes relationship between principal elements of GHP and social perception.

**Table VI-8: Answers of Outside Relationship's questions in bar chart of percentage**



#### 5.1 Outside activities in your daily life

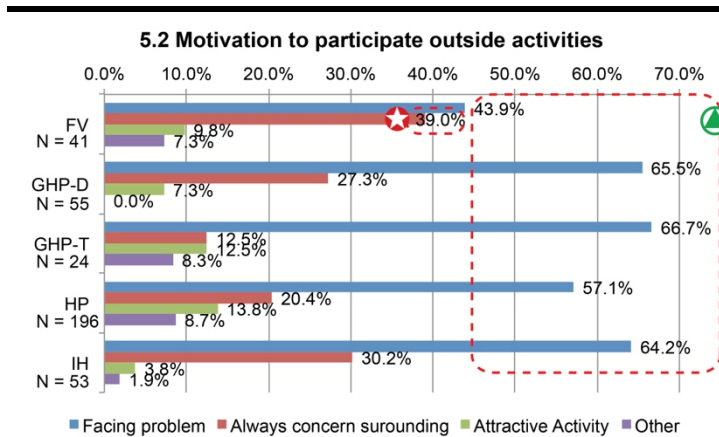
Every type of community has similar three activities that are 'buying food at market', shopping at department store', and 'religious activity'. Thus the places such as fresh market, department store, temple, public facility, and local service can promote people interaction of residents from different community. 12.0% of FV and 12.8% of IH are often attend public events which are held by local government . Residents in GHP-D and GHP-T take longer time to work in this area and use public facility than other communities. This evidence reflects traffic problems in district scale. FV and IH take time almost 30 minutes to go to shopping that mirrors location of department store distance from their communities . Time consumption in HP is similar between each type of outside activities that means HP has good location.



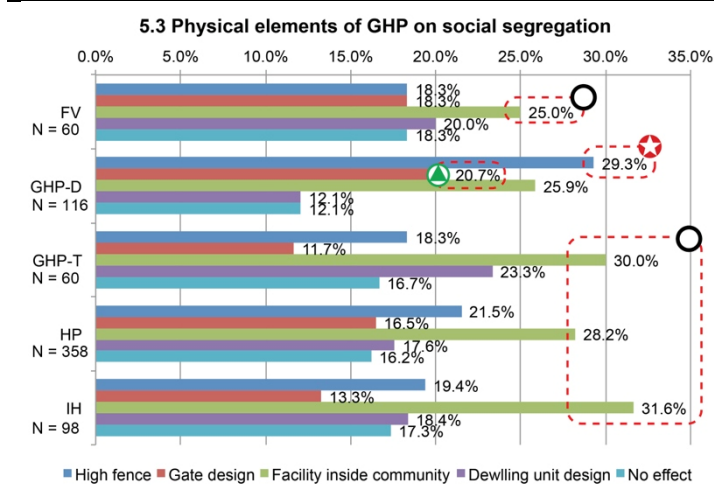
The evidence shows GHP-D has lowest number of outside activities. That means GHP-D has less opportunities to interact with other communities.

#### 5.2 Motivation to join outside event (multiple choose)

The result shows around half of respondents in every community joins outside activity during crisis experience. This complies with the notions above



that they possibly have greater community bond in area. FV's respondents ★ attend outside activities not only when they face crisis experience but they also are attentive people. Moreover it seems to be attractiveness cannot motivate residents that much.



### 5.3 Physical design of GHP effect on social segregation (multiple choose)

High fences and gates of GHP have much impact on feeling of GHP-D (29.3% ★ and 20.7% ▲). Around 25% - 30% in FV, GHP-T, HP, and IH ○ think inside facilities of GHP identify the differences. GHP-T also concerns about housing design units at 23.3%.

**Table VI-9: Means of chosen answers in OR**

Part5: Perception to surrounding community						
	Former Village	GHP-D	GHP-T	HP-No gate	Individual house	Overall
5.4. Perception to outside community	<b>Means: 2.09</b> <b>(N=34)</b> <b>Std. 0.712</b>	<b>Means: 2.06</b> <b>(N=52)</b> <b>Std. 0.608</b>	Means: 2.26 (N=23) Std. 0.689	Means: 2.26 (N=175) Std. 0.643	Means: 2.17 (N=47) Std. 0.732	Means: 2.20 (N=331) Std. 0.663
	1.00 – 1.49 = Feel Bad		1.50 – 2.49 = Neutral		2.50 – 3.00 = Feel Good	
Legend: FV = Former Village    GHP-D = Gated Housing Project (Detached house)    GHP-T = Gated Housing Project (Townhouse) IH = Individual House    HP = Housing Project without Gate    N = Number of respondent						

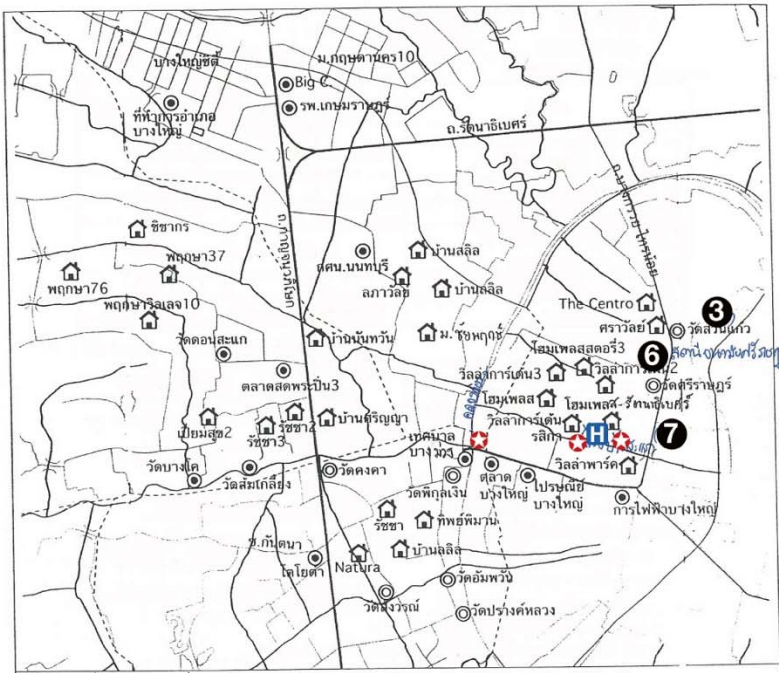
Table VI-9 shows overall perception of respondents on surrounding communities. Although their perceptions are in similar level as neutral but means of FV and GHP-D have lower scale of perception to surrounding than others. This result can be supported by an informal conversation in FV, some resident claimed that their agricultural lands were declined because of wastewater from GHP.

To indicate location of daily activities of respondents in district scale, the outside activity map is added in section of Question 5.1. We asked respondents to mark locations of their houses and those activities as shown in Figure VI-5. The study revealed that FV prefer to usually go use local service, public facility, and temple nearby

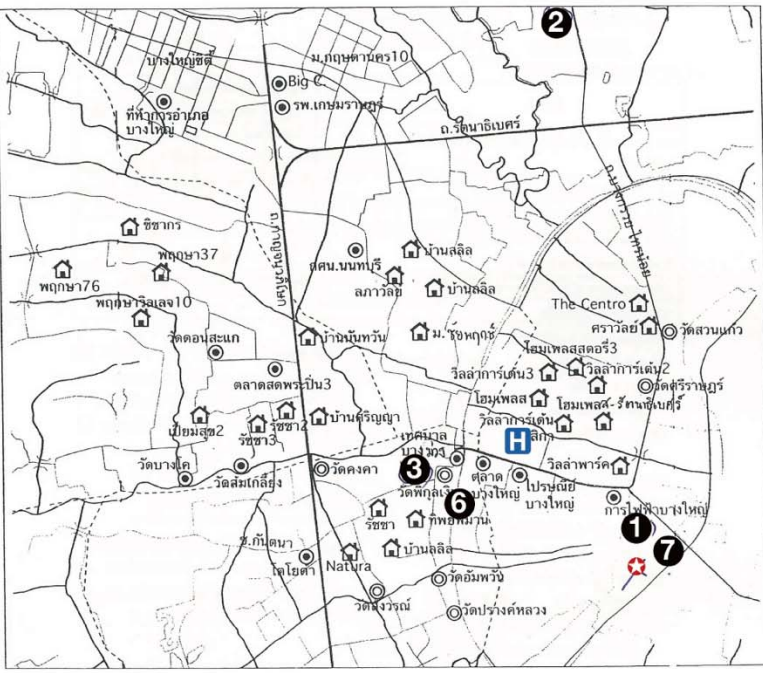
their communities. Therefore, it is difficult for them to meet other community's members. The north of district seems to be a node because main departments store and hospital locates along the highway. GHP-T, HP, and IH often go to that area. Thus, it is possible for them to interact across communities. For GHP-D, they usually go to nearby area of their communities, except for shopping. However, GHP-D's usage area is not overlapped on FV's area, and then it is difficult to have a chance of interaction.



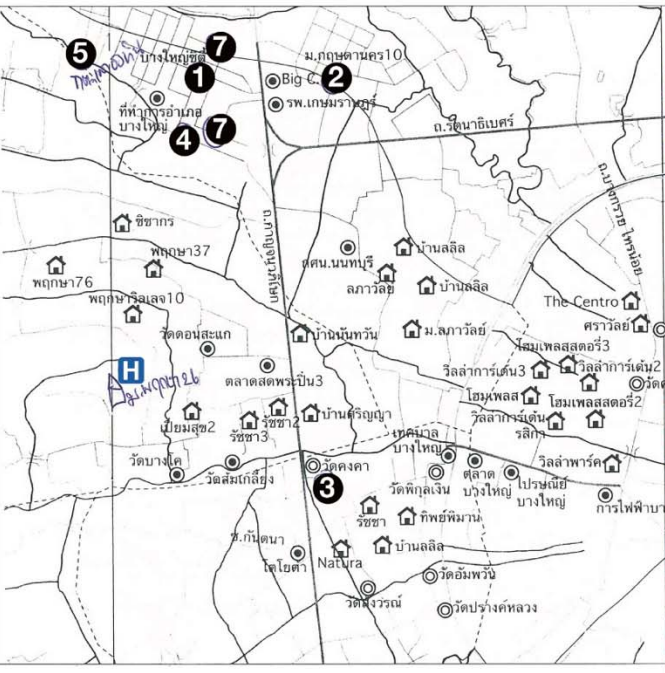
# Bangyai district, NONTHABURI province



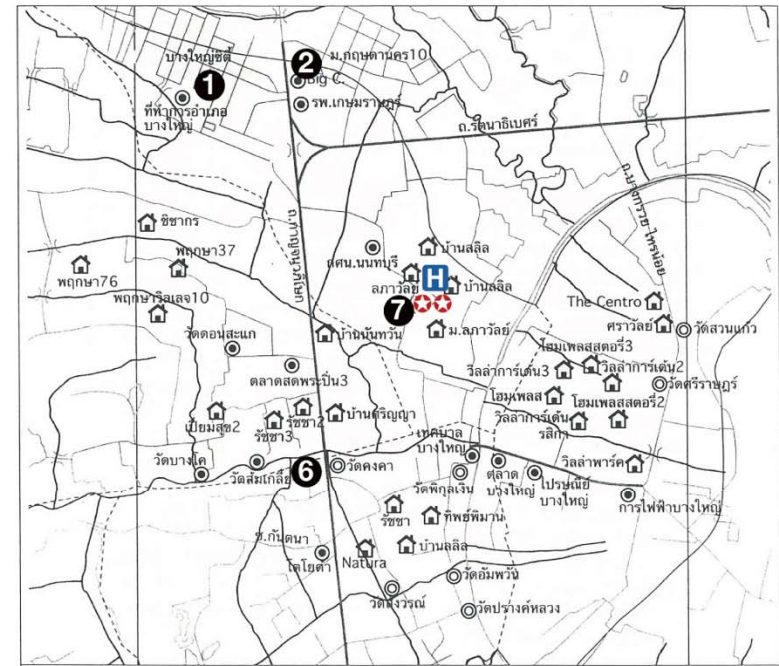
Former Village



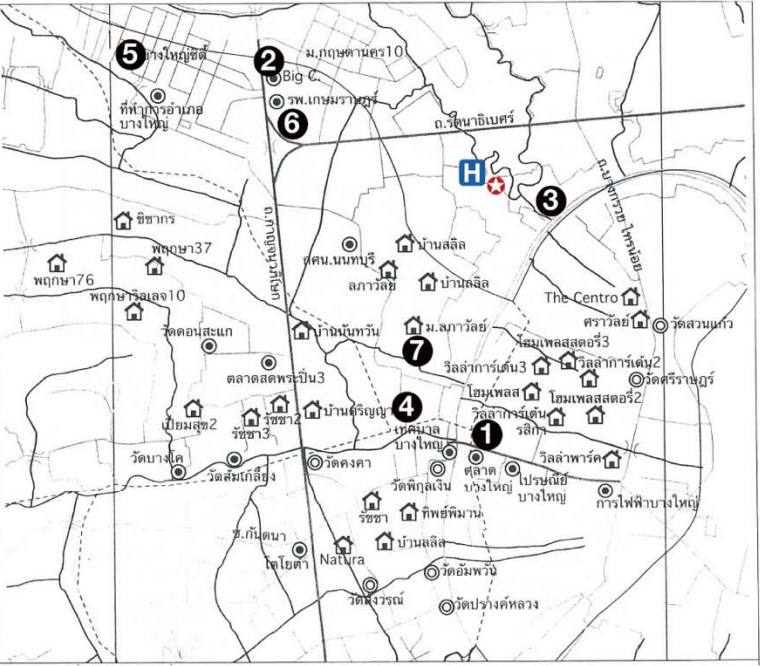
GHP-Detached house



GHP-Townhouse



Housing Project - No gate



Individual House

- LEGEND: Outside activity**
1. Buying food at Market
  2. Shopping at Department Store
  3. Religious activity
  4. Participate public event
  5. Working
  6. Using Public Facility; hosital, government office, park
  7. Using Local Service; Salon, small grocery store
- LEGEND:**
- Respondent's house
  - Friends / Acquatances
  - Gated Housing Project
  - Landmark; Temple, Government Office, Commercial center

Figure VI-5: Outside activity map  
(Source: author, 2013)



#### 6.4. Attitude of external stakeholder (developers and local government officers)

Beside the opinion and perception of residents in study area, one of influenced stakeholder is unavoidable to interview developer and local government officer. A representative of private developer<sup>5</sup> who is a local housing company in this area is interviewed. The consequence of urbanization in study area is higher land cost and reaches 80,000 JPY/sq.m. This reason made developers to support migration of former villagers to leave their farms and move to further location to run the agricultural business. In his opinion, GHP could bring about newcomers that are good for local business. The former villagers should adjust their life styles to survive in this situation. Moreover, size of GHP should be limited because it is difficult to set juristic committee for self-maintenance when the project are fully occupied. Additionally, they mentioned that the quality of wastewater treatment system of GHP have been strictly controlled by local government. Therefore, the impact of GHP can be reduced with collaboration between private and public sector.

Nevertheless, mayor of Bangmuang district<sup>6</sup> has different attitude, he realized existing situation and impact of GHP on former villagers such as environmental problem and participation problems, because he is a local who was born in this area. The location of FV located on intersection of three main canals, where waste water from GHP through minor canals, then, pass by the main canals. Although wastewater treatment of GHP is strictly controlled, but there are illegal wastewater releasing in rainy season and some under standard of treatment. Consequence, FV cannot consume water in the canals and cannot produce agricultural products, therefore, their life style have changed to commercial activity and cultural tourism. Moreover, mayor described more about the difficulty of development plan in this area, which is a lack of participation from GHP communities. From the interview, we revealed that both stakeholders know the impact of GHP on FV's life style but there is a lack of collaboration of all relevant stakeholders and communities in order to reduce the effects and figure out the compromising solution.

#### 6.5. Findings and Conclusion

The social interaction assessment is an evaluation of impact of GHP that were used in this study. Three results from physical observation, questionnaire, and interview were analyzed to understand existing situation and impact in Nonthaburi province, and lead to suggestions.

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<sup>5</sup> Interviewee: Dr.Pairoj Sukjan, President of Buathong Property Company Limited, 2013.03.13

<sup>6</sup> Interviewee: Mr.Pornthep Pradubploy, Mayor of municipality of Bangmuang subdistrict, 2013.03.11  
Bangmuang district covers most of former villages.

### 6.5.1. Physical Environment

Physical evidences that are revealed above, the characteristic of physical environment of Bangmuang district can be summarized follow;

(1) Most of land configurations are organic form according by natural canal system. Former inhabitants used these canals for daily life and agricultural products transportation. Thus, entrances of former villages directly connect to the canals.

(2) A highway has been developed since 1987 connecting Bangkok city to northern area. Next, the main roads connect from this highway to communities. They located in between canal system behind former communities. This situation unintentionally motivates modern housing developments locate between the main roads and back of former communities.

(3) Consequence, fences of modern housing projects (GHP-D, GHP-T, and HP) is a symbolic element used as boundary of community. Although the gate is eliminated, but the fence still exists and effects on FV's settlement by enclosing their accesses, and then becomes landlocked plots (Figure VI-6).

(4) There is emerging of rapid encroachment of gated housing projects. Former villagers who are active agriculturists divided their lands for new housing development. Unfortunately, an ineffective water treatment in those projects leads to environmental problems in agricultural land use. This has become confusion of land use and 'hybrid land use' between agricultural and residential land use.

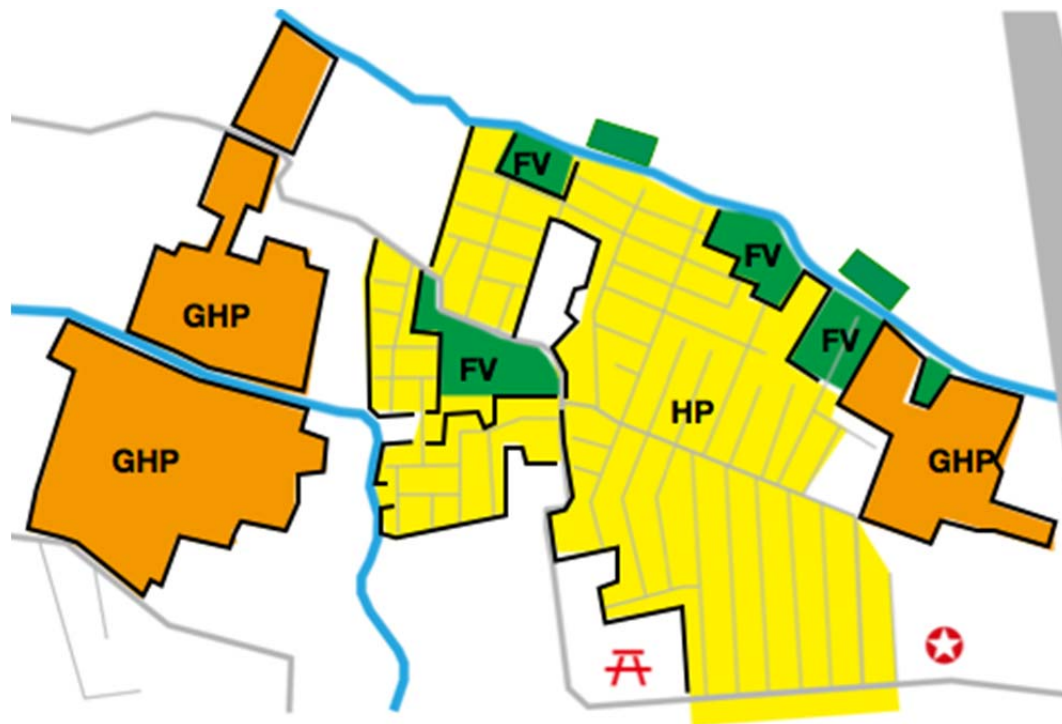


Figure VI-6: Disturbance of accessibility

### 6.5.2. Inside and Outside neighborhood relationship

Moreover, we found a big gap of income between former people and newcomers, namely, most of residents in GHP-D are middle to high class but others are low to middle class. This causes difficulty of making unification in district scale because they need to enhance social interaction of residents, as a mayor mentioned in interview results.

**Table VI-10: Significant characteristic related with inside and outside relationship**

Inside Relationship	FV	GHP-D	GHP-T	HP	IH
Common attractive activities	Traditional and Voluntary	Traditional and Community meeting	Traditional and Sport	Traditional	Traditional
Low attractive activities	-	Sport	Community meeting, Voluntary or Never participation	Community meeting and Sport	Voluntary
Inside Perception	Friendly neighbors				
Number of friends	Over 15 persons	Over 15 persons	0 – 5 persons	Over 15 persons	Over 15 persons
The way to interact	Neighbors who live nearby their houses				
Frequency of social interact	Almost everyday	Never talk to neighbors		Almost everyday	Almost everyday
Community Bond	Proud to live here	Neighborhood is important			
Overall Inside Relationship	2.98	2.76	2.70	2.86	2.85
Outside Relationship	FV	GHP-D	GHP-T	HP	IH
Frequent activities and places	Buying food (at market) and Religious activities (at Temple)				
Number of outside activities	4.63	4.75	5.26	4.87	3.92
Motivated Reasons	Facing problems				
Segregated elements	Common facility inside GHP	High fence and gate	Common facility inside GHP		
Outside perception	2.09	2.06	2.26	2.26	2.17
Overall Outside Relationship	3.21	3.42	3.84	3.64	3.27

The behavior of respondents related with inside and outside neighborhood relationship in each community, which can be concluded as follow;

#### 1) Former village (FV):

There outside relationship have the lowest level (Table VI-10). This result can be clarified through the lowest perception on surrounding communities. Most of them are local people, thus they have the highest inside neighborhood relationship. This assumption is supported through high trust on neighbors and community leaders, highly proud to live in community, and huge number of friends and acquaintances inside community. However, we found high dissatisfaction on environment inside

community, which may be influenced by disturbance of accessibility from GHP's and HP's location (Figure VI-7). At the same time, surrounding gated housing projects encroach their agricultural activities in paddy fields. This leads to lower overall outside relationship.

#### 2) Gated Housing Project with Detached houses (GHP-D):

The physical condition of GHP-D is still kept elements as typical GHP in BMR. They also pay attention on gates and fences design. Although, these physical elements of GHP can fulfill the needs more than other communities, respondents still face problems for living, especially in common area inside GHP-D. The profile of respondents is very different from other communities. They are affluent who need more privacy like solitary personality (Table VI-11). That is why gate and fence are required to make exclusiveness and separation from surrounding communities. Although respondents are aware on importance of participation, the overall inside neighborhood relationship is still low. This contrast result shows an inappropriate current community management system.

#### 3) Gate Housing Project with Townhouse (GHP-T):

The inside neighborhood relationship becomes the lowest level because they have very never participated in common activities, have less interaction among residents. Contradiction, the outside relationship reach the highest level because locations of GHP-T are close to node of district or commercial area. The residents facilitate to do outside activities. Moreover, they concern on housing units design that effects on social segregation. These findings are unexpected and refuses general image of segregation in GHP from surrounding communities.

**Table VI-11: Nature of GHP in Nonthaburi case**

Characteristics	GHP-T	GHP-D
Behavior	No cooperation, Less Interaction, No mindedness, Solitary personality, and No confidence to take responsibility	Low sacrifice, No confidence to take responsibility, and Solitary personality
Active activities	Traditional and Religious activities	Traditional and Religious activities Community meeting Common event
Reinforcer for social improvement	Neighbors	Neighbors
Physical condition	1) Completely closed 2) Connect to road network 3) Non-adapted GHP (Typical GHP)	1) Completely closed 2) Connect to road network 3) Non-adapted GHP (Typical GHP)

#### 4) Housing Projects without gates (HP):

HP is a representative of transformation of GHP. The important element such as 'controlled gate' and 'community management system' is eliminated. The physical condition of HP shows non-completely closed walls of the project. This opening of wall and gate supports high level of overall inside and outside relationship of HP. Moreover, it leads to familiarity on outsiders and consequence to higher outside relationship.

Residents in HP and IH have similar perception, namely, they place important on neighbors and believe in their communities, even they have hardly visited their neighbors. The religious activity can motivate them to join and enhance accidentally contact with outside residents.

5) Individual house (IH):

Even if their communities have no clear boundaries, they have many friends and acquaintances. Their overall inside relationship is similar to HP, while the outside relationship resembles with FV. Their usage area in outside activity map shows that they broadly go to do external activities.

According to whole results above, we can assume that FV's respondents have quite strong inside neighborhood relationship, and they have civic duty and public mind for inside-outside community. Although, GHP-D residents have low interaction with neighbors, but they have good perception to inside community environment and become closed-community. They satisfied to live in high fence and gate of GHP to make them feel extraordinary. GHP-T have low participation inside and outside activity, hence, they have quite weak neighborhood relationship. It can be noticed via low trust on neighbors. In conclusion, the social interaction depends on different type of community and characteristic of residents. Former villagers seem to be the ideal residents who have no barrier to enhance social interaction, but they slowly migrate from this area because of GHP's threat. Therefore, the upcoming gated housing projects should paid more attention on former communities with redesigned the gates and fences, and choice of location, in order to reduce impacts in the future.

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## PART 3

### **Statistic Analysis of effects evaluation of Gated Housing Project Development to examine influenced factors**

This part consists of **Chapter VII** that aims to analyze quantitative results from questionnaire of Pathumthani and Nonthaburi case study area. This chapter will reveal tendency of inside and outside neighborhood relationship. The influenced factors that can promote social relationship are also exposed to suggest the recommendation in final chapter. The comparison analysis is also applied to clarify the residential area that can make better social relationship.



## CHAPTER VII

### Analysis of Effect Evaluation on neighborhood relationship and physical environment

#### 7.1. Introduction

After Chapter V and VII evaluated effects of gated housing projects in district and community scale, this chapter aims to analyze results from both chapters. Because those findings explore existing situation in study areas, characteristics of residents, and report of inside – outside neighborhood relationship in community scale. It is important to investigate previous results to achieve the prospected outcome of research. This chapter consists of two methods of analysis that is conducted in district scale as follow;

Tendency analysis is applied to investigate ‘factors’ influencing on overall neighborhood relationship as ‘causes’ of social effect. ANOVA and T-Test analysis method in SPSS program is used according by calculated data from previous chapters. Comparison analysis is implied to emphasize differences of physical environment, existing effects, and level of neighborhood relationship in big picture.

The results can lead to guideline for improve gated housing projects and its advantages and disadvantages in both formats of residential area.

#### 7.2. Tendency Analysis

As mentioned above, it is necessary to investigate ‘factors’ influencing on overall neighborhood relationship in study area as tendency analysis. We aggregate answers within five dimensions of inside - outside relationship into five scales of relationship; very low, low, average, high, very high, and set them as dependent variable. The independent factors are initially selected from previous researches about correlated factors on sense of community and neighborhood relationship following (Table VII-1 and VII-2);

*Physical environment:* Social interaction is promoted by designing residences. Those residents are encouraged to get out of their houses and out into public sphere. The architecture and site design is one of the design elements that used to promote

sense of community (Talen, 1999). Thus there are questions that refer to design elements in the questionnaires are type of community, clear boundaries (gates), and strict access (guards). The type of community is assorted by difference of physical environment of community, divided into five types in existing study area.

*Background of respondents:* Study of sense of community of gated residential in Asian cities (Sakip, Johari, and Salleh, 2012) also revealed there were significant differences between age and sense of community gated residential. While the length of occupancy in the residential area was significant in non-gated residential. Hence, personal background of residents also influences on sense of community; age and period of occupying are prospected as influenced factors. Moreover, face-to-face interaction is further promoted with increased density (Talen, 1999). This notion is supported from arguments that mention low-density living reduces social interaction (Brueckner and Largey, 2008). Thus size of household, asking number of dwellers in house, is considered to be one of independent factors. This variable can reflect density of residents in a housing unit towards overall density of community. Socio-economic is a perspective that should not overlook. It was found to be associated with enclosure; defining very homogeneous territories are especially on income criteria (Le Goix, 2003). Hence, 'income' also becomes an independent variable that associates with social relationship. Additionally, 'closeness of community' is asked how much residents accept outsiders to do experience together, which is no. 3.2.2. of questionnaire. This variable can estimate a characteristic of community that is 'closed' or 'opened' community. It is an expected factor that influences on neighborhood relationship as well.

Next, the independent and dependent factors are calculated to clarify significant association through ANOVA and T-Test via SPSS program. Since then we comprehend that 'some factors' influence on neighborhood relationship of respondents in different communities. The findings from evaluations; characteristic of respondents, inside-outside neighborhood relationship assessment, tendency analysis, and physical evidences, will be synthesized in each study area. As mentioned above, the data collecting tools of neighborhood relationship in this research includes; physical observation, questionnaire, and interview, to achieve the aim of study. These preliminary conclusions are discussed to propose for future recommendation.

**Table VII-1: Independent Factors**

	Independent Factors (Literature)	Data	Detail	SPSS
<b>Physical Elements</b>	<b>Type of Community</b> Environment influences on relationship	Nominal	1. Former Village (FV) 2. Gated Housing Project with Detached houses (GHP-D) 3. Gated Housing Project with Detached houses (GHP-T) 4. Non-Gated Housing Project (HP) 5. Individual House (IH)	ANOVA
	<b>Gate vs No-Gate</b> Clear boundaries influence on relationship	Nominal	1. Yes 2. No	T-test
	<b>Guard vs No-Guard</b> Strict access influences on relationship	Nominal	1. Yes 2. No	T-test
<b>Background of Respondents</b>	<b>Size of Household (SOH)</b> Reflects density of residents in housing unit	Ordinal	1. 1 person 2. 2 – 3 persons 3. 4 – 5 persons 4. Over 5 persons	ANOVA
	<b>Income (INC)</b> Reflect socio-economic in community	Ordinal	1. lower 10,000 THB 2. 10,001 – 30,000 THB 3. 30,001 – 50,000 THB 4. 50,001 – 70,000 THB 5. Over 70,001 THB	ANOVA
	<b>Length of Occupancy (LOO)</b> Reflects familiarity of residents in area	Ordinal	1. Lower 5 years 2. 6 – 10 years 3. 11 – 15 years 4. 16 – 20 years 5. Over 21 years	ANOVA
	<b>Age (AGE)</b>	Ordinal	1. Lower 19 ages 2. 20 – 29 ages 3. 30 – 39 ages 4. 40 – 49 ages 5. Over 50 ages	ANOVA



**Table VII-2: Dependent Factors**

	Dependent Factors (Literature)	SPSS
<b>Inside Relationship (IR)</b>	<b>I. Membership (MBS)</b> Level of Membership	<b>MEAN</b>  1.0 – 1.8 = Very Low 1.9 – 2.6 = Low 2.7 – 3.4 = Average 3.5 – 4.2 = High 4.3 – 5.0 = Very High
	<b>II. Influence (IFE)</b> Bidirectional concept: community <> Individual Number of chosen answers	
	<b>III. Integration &amp; Fulfillment of Needs (FON)</b> 1) Success of Community 1.1 Your community can solve by themselves 1.2 The best thing for community as yours 1.3 Feel good when someone help your community	
	Integration & Fulfillment of Needs 2) Fulfillment of Needs 2.1 Perception on inside community 2.2 Environmental Satisfaction 2.3 Trusted in neighbors	
	<b>IV. Shared Emotional Connection (SEC)</b> “The more people interact, the more they likely they are to become close” 1) Number of recognized neighbors 1.1 Number of Acquaintances in community 1.2 Number of Friends in community	
	2) Neighborhood Interaction 2.1 Frequency of neighbor’s visiting 2.2 Frequency of talking to neighbor	
	3) Spiritual Bond 3.1 Level of community bond 3.2 Interdependent neighbors	
<b>Outside Relationship (OR)</b>	<b>Outside Relationship (OR)</b> “The more people interact, the more they likely they are to become close” 1) Number of outside activities that you participated 2) Perception on surrounding community	

### 7.2.1. Congested GHP development area: Influenced Factors of Inside and Outside Neighborhood Relationship

Although the descriptive analysis clarifies characteristic of respondents and explication of neighborhood relationship in previous section, it is essential to further investigate the correlation of factors that influence on neighborhood relationship. The prospected independent factors are completely explained in Chapter IV. They are considered according previous reviews of psychological and urbanism researches. However, the typical influenced factors are still being background of respondents and physical environment. Previously, there are no final conclusion what factors influenced on social relationship of residents, depending on context. The factors below are used to prove that associate with social relationship as former works’ hypothesis. Herein we also keep investigating the correlation between both independent factors: physical environment and background of respondents; and dependent factors: inside and outside neighborhood relationship, in BMR context. According to format of data, ANOVA and T-Test are applied as statistic analysis. Beside the results are compared among five types of community, the influenced factors are also revealed and lead to ideas about

recommendation in Chapter VII.

## (1) Physical Elements of Communities

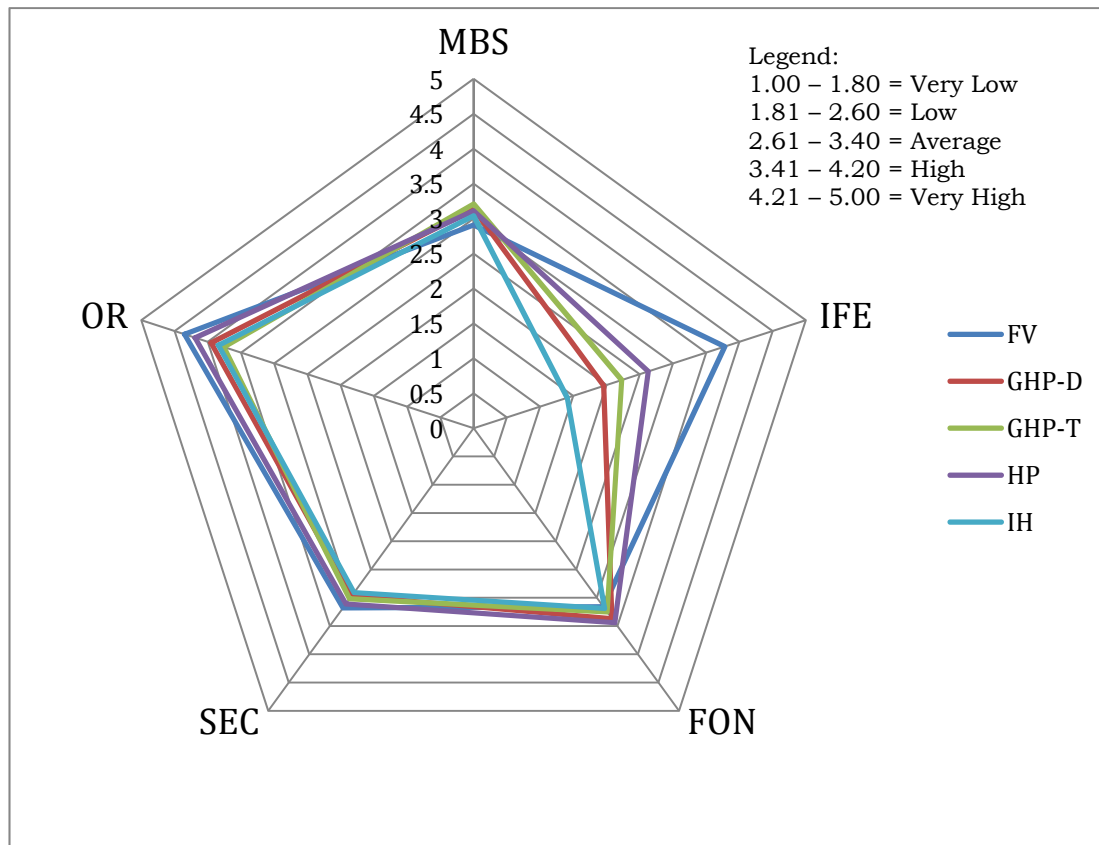
### 1.1) Type of community

Type of community is the first phase that categorize group of residences following empirical evidences in physical observation. Thus the questionnaires were distributed through five types of community in study area, they should be examined as the beginning of discussion to understand overall neighborhood relationship (Table VII-3). Next, the related dimensions of inside neighborhood relationship (IR) will be investigated via ANOVA analysis (Table VII-4).

**Table VII-3: Summary of Inside and Outside Relationship – Type of Community**

Physical Factors		IR				OR
Type of Community		MBS	IFE	FON	SEC	
Former Village (FV)	Mean	2.91	3.78	3.16	3.18	4.35
	N	37	37	34	37	36
	Std.	1.474	1.834	0.235	0.387	0.859
		Average	High	Average	Average	Very High
	Total	3.26 (Average)				
Gated Housing Project with Detached houses (GHP-D)	Mean	3.14	1.96	3.37	2.97	3.95
	N	68	67	63	68	67
	Std.	1.068	1.665	0.482	0.510	0.932
		Average	Low	Average	Average	High
	Total	2.86 (Average)				
Gated Housing Project with Detached houses (GHP-T)	Mean	3.21	2.23	3.25	3.02	3.76
	N	78	77	78	78	76
	Std.	1.315	1.739	0.415	0.523	0.872
		Average	Low	Average	Average	High
	Total	2.93 (Average)				
Non-Gated Housing Project (HP)	Mean	3.11	2.63	3.44	3.11	4.19
	N	41	41	38	41	40
	Std.	1.344	1.972	0.346	0.502	1.031
		Average	Average	Average	Average	High
	Total	3.07 (Average)				
Individual House (IH)	Mean	3.04	1.41	3.19	2.91	3.84
	N	70	70	70	69	69
	Std.	1.286	1.173	0.382	0.445	0.937
		Average	Very Low	Average	Average	High
	Total	2.64 (Average)				

Legend: (Re) = Residential Area      (Ind) = Industrial Area      (Com) = Commercial Area  
 (Agri) = Agricultural Area      N/A = Not available area



**Figure VII-1: Level of inside and outside relationship in five types**

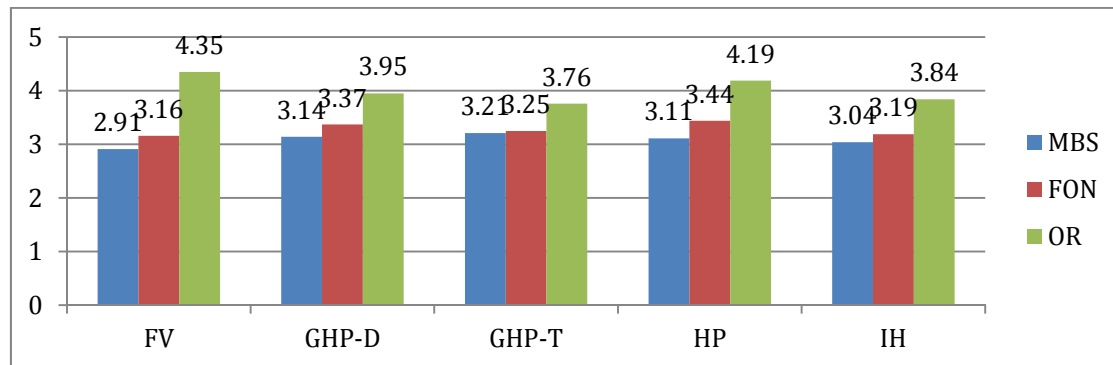
As comparison of mean in Table VII-3 and Figure VII-1, We found the difference of level of neighborhood inside-relationship (IR) and outside-relationship (OR) that was shown in five dimensions. The IFE factor is the only dimension that five communities are extremely different. This factor reflects strength of bond inside community, thus FV has very robust community bond. On the other hand, GHP-D and GHP-T has weak bond of community. In addition, FV also reach very high OR comparing other communities. When consider total value of means show FV has very high OR and stronger IR than others as well. This can assume former villagers have greater neighborhood relationship, although they may receive direct effects from GHP development. Therefore the clear boundaries and planned community design, like GHP-D and GHP-T, cannot confirm the strength of neighborhood relationship as literature review.

**Table VII-4: ANOVA analysis between Type of Community and Neighborhood Relationship**

Factors		Sum of Square	df	Mean Square	F	Sig.
Membership (MBS)	Between group	2.684	4	0.671	0.409*	.000
	Within group	474.468	289	1.642		
	Total	477.152	293			
Influence (IFE)	Between group	147.656	4	36.914	13.489	.844
	Within group	785.426	287	2.737		

	Total	933.082	291			
Integration and Fulfillment of Needs (FON)	Between group	2.436	4	0.609	3.841*	.001
	Within group	44.088	278	0.159		
	Total	46.524	282			
Shared Emotional Connection (SEC)	Between group	2.13	4	0.533	2.273	.062
	Within group	67.468	288	0.234		
	Total	69.598	292			
Outside Relationship (OR)	Between group	13.915	4	3.479	3.347*	.011
	Within group	180.415	281	0.642		
	Total	194.33	285			

\* F is significant at the 0.05 level.



Legend: 1.00 – 1.80 = Very Low

1.81 – 2.60 = Low

2.61 – 3.40 = Average

3.41 – 4.20 = High

4.21 – 5.0 = Very High

**Figure VII-2: Comparison of correlated factors in type of community**

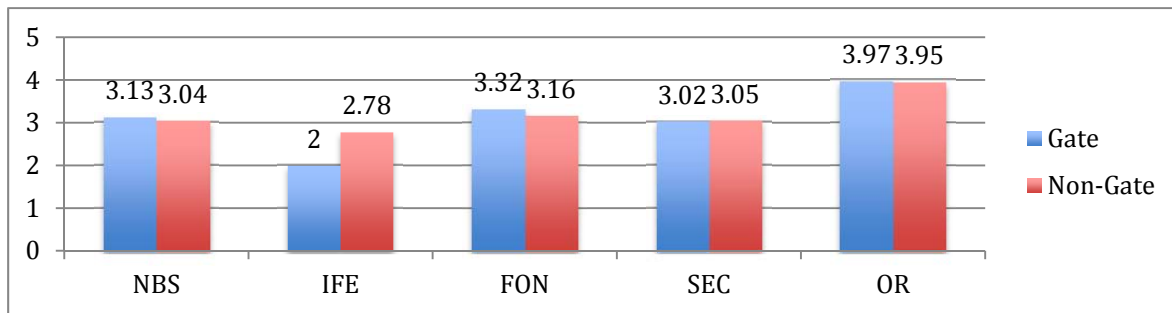
Table VII-4 and Figure VII-2 intends to investigate the influenced factors on IR and OR via different type of communities. We found the different types of community impacted on MBS, FON, and OR. Only FV have very high level of OR, while another communities have high level. It reflects FV's inhabitants often join outside activities and have good perception on surrounding communities (see details in Chapter V). HP's residents have higher level of fulfillment of needs than others. MBS is similar level among communities.

## 1.2) Gates and Security guards

**Table VII-5: T-Test analysis between Gate/Non-Gate and Neighborhood Relationship**

	Gate			Non - Gate			T-test	
Neighborhood Relationship	N	Mean	Std.	N	Mean	Std.	T	Sig.
Membership (MBS)	216	3.13 (Average)	1.259	84	3.04 (Average)	1.306	0.581	.497
Influence (IFE)	215	2.00 (Low)	1.667	83	2.78 (Average)	1.963	-3.233*	.000
Integration and Fulfillment of Needs (FON)	211	3.32 (Average)	0.416	78	3.16 (Average)	0.360	2.976	.063
Shared Emotional Connection (SEC)	215	3.02 (Average)	0.486	84	3.05 (Average)	0.516	-.422	.359
Outside Relationship (OR)	211	3.97 (High)	0.959	83	3.95 (High)	0.905	.171	.311

\* T is significant at the 0.05 level.



Legend: 1.00 – 1.80 = Very Low      1.81 – 2.60 = Low      2.61 – 3.40 = Average  
 3.41 – 4.20 = High      4.21 – 5.0 = Very High

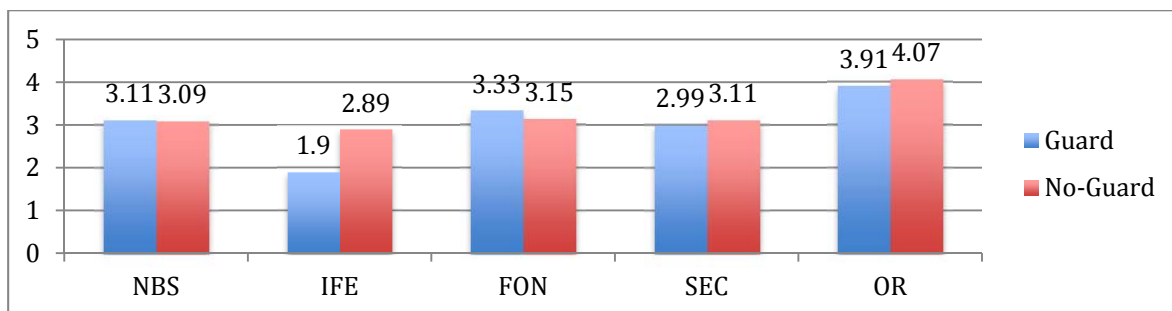
**Figure VII-3: Comparison of Gate and Non-Gate**

**Table VII-6: T-Test analysis between Guard/Non-Guard and Neighborhood Relationship**

Neighborhood Relationship	Guard			Non - Guard			T-test	
	N	Mean	Std.	N	Mean	Std.	T	Sig.
Membership (MBS)	204	3.11 (Average)	1.231	96	3.09 (Average)	1.357	.170	.096
Influence (IFE)	203	1.90 (Low)	1.600	95	2.89 (Average)	1.976	-4.308*	.000
Integration and Fulfillment of Needs (FON)	199	3.33 (Average)	0.411	90	3.15 (Average)	0.374	3.514	.148
Shared Emotional Connection (SEC)	203	2.99 (Average)	0.493	96	3.11 (Average)	0.487	-2.093	.983
Outside Relationship (OR)	199	3.91 (High)	0.897	95	4.07 (High)	1.029	-1.229	.392

\* T is significant at the 0.05 level.

Legend: 1.00 – 1.80 = Very Low      1.81 – 2.60 = Low      2.61 – 3.40 = Average  
 3.41 – 4.20 = High      4.21 – 5.0 = Very High



**Figure VII-4: Comparison of Guard and No-Guard**

In Table VII-5, gate and fences influence only IFE. Figure VII-3 shows Non-gated communities have higher IFE than others. Gated communities have low IFE but Non-gated have average level of IFE. T value in Table VII-6 shows existing of 'Guard' significantly relates with IFE. When consider mean value, we found Non-Guard community has higher level of influence than having Guard community. In other words, Non-Guard community has stronger bond of community than others. Figure VII-4 also obvious different relationship of community.

## (2) Background of Respondents

When the answers in background of respondents' section were scales, the ANOVA was one by one applied to find the influenced factors on neighborhood relationship. They consisted of Size of Household (SOH), Family's Income (FIN), Length of Occupancy (LOO), and Age (AGE). They were selected from all questions of BR through literature review from the previous studies. The results are shown as follow;

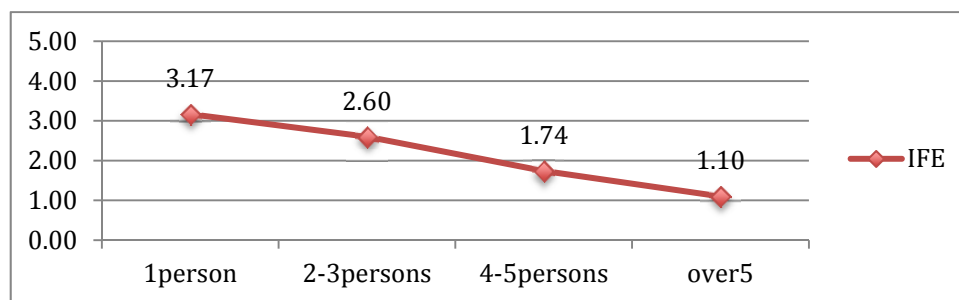
### 2.1) Size of Household (SOH)

Size of household can mirror size of appropriate dwelling unit for family. Thus number of family member within a house should be concerned about neighborhood relationship. Table VII-7 shows that size of household significantly influences on IFE factor. In the other word, size of dwelling unit involve with strength of bond of community. Figure VII-5 presents the bigger family they are, the less strength bond of community they have.

**Table VII-7: ANOVA analysis between Size of Household (SOH), IR, and OR**

		Sum of Square	df	Mean Square	F	Sig.
Membership (MBS)	Between group	1.984	3	0.661	0.422	.738
	Within group	287.07	183	1.569		
	Total	289.054	186			
Influence (IFE)	Between group	60.55	3	20.183	8.428*	.000
	Within group	433.429	181	2.395		
	Total	493.978	184			
Integration and Fulfillment of Needs (FON)	Between group	0.361	3	0.12	0.702	.552
	Within group	30.74	179	0.172		
	Total	31.101	182			
Shared Emotional Connection (SEC)	Between group	0.113	3	0.038	0.125	.945
	Within group	54.991	182	0.302		
	Total	55.104	185			
Outside Relationship (OR)	Between group	0.69	3	0.23	0.219	.888
	Within group	185.656	177	1.049		
	Total	186.346	180			

\* F is significant at the 0.05 level.



Legend: 1.00 – 1.80 = Very Low      1.81 – 2.60 = Low      2.61 – 3.40 = Average  
3.41 – 4.20 = High      4.21 – 5.0 = Very High

**Figure VII-5: Means of IFE in size of household**

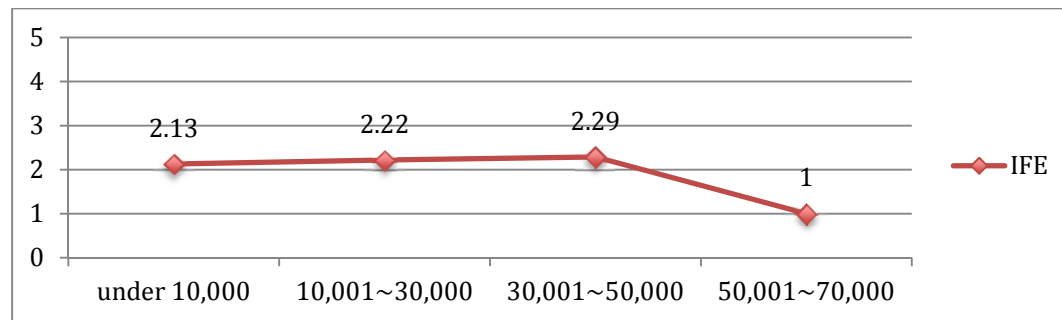
## 2.2) Family's Income (FIN)

Income of household is one of factors that can define homogeneous territories of residents in community. The homogeneity can promote strong community. Results from the One-way ANOVA test found that the family's income is significant in influence factor ( $F=0.97$ ,  $p<0.05$ ) whilst other factors are not. This finding shows that the wealthier a resident resides in a residential area, the higher strength of bond of community nurtures. This results show in Figure VII-8.

**Table VII-8: ANOVA analysis between Family's Income (FIN), IR, and OR**

		Sum of Square	df	Mean Square	F	Sig.
Membership (MBS)	Between group	1.662	3	0.554	0.341	.809
	Within group	477.197	294	1.623		
	Total	478.859	297			
Influence (IFE)	Between group	9.201	3	3.067	0.97*	.000
	Within group	923.434	292	3.162		
	Total	932.635	295			
Integration and Fulfillment of Needs (FON)	Between group	1.15	3	0.383	2.372	.071
	Within group	45.748	283	0.162		
	Total	46.899	286			
Shared Emotional Connection (SEC)	Between group	0.086	3	0.029	0.117	.813
	Within group	71.928	293	0.245		
	Total	72.014	296			
Outside Relationship (OR)	Between group	3.165	3	1.055	1.182	.317
	Within group	257.13	288	0.893		
	Total	260.294	291			

\* F is significant at the 0.05 level.



Legend: 1.00 – 1.80 = Very Low      1.81 – 2.60 = Low      2.61 – 3.40 = Average  
 3.41 – 4.20 = High      4.21 – 5.0 = Very High

**Figure VII-6: Means of FON in family income**

## 2.3) Length of Occupancy (LOO)

As previous work mentioned that length of occupancy in the residential area was significant on sense of community. Because residents can share more experience during living in community, then their relationship would be promoted. As shown in Table VII-9, the comparison between neighborhood relationship dimensions shows three factors are significant, namely, influence, shared emotional connection, and outside relationship.

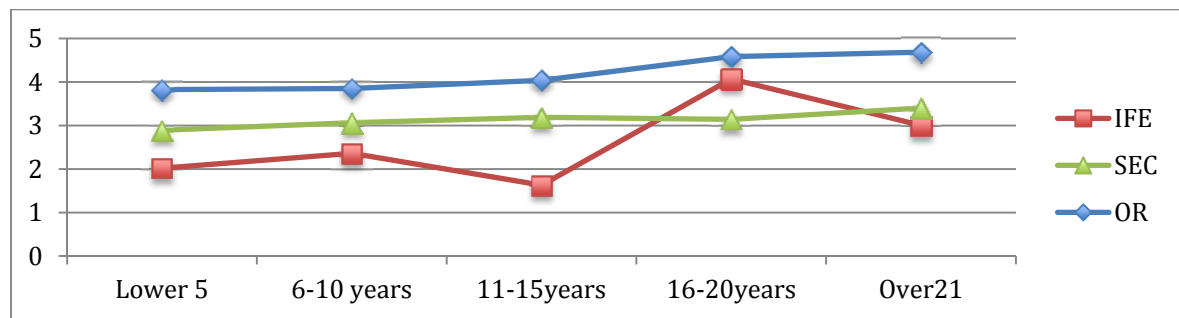


All influenced dimensions have same direction of relationship, which is the longer a resident resides in community, the higher sense of community encourages. The results show in Figure VII-9.

**Table VII-9: ANOVA analysis between Length of Occupancy (LOO), IR, and OR**

		Sum of Square	df	Mean Square	F	Sig.
Membership (MBS)	Between group	5.39	4	1.348	0.841	.593
	Within group	449.991	281	1.601		
	Total	455.381	285			
Influence (IFE)	Between group	77.149	4	19.287	6.379*	.000
	Within group	843.57	279	3.024		
	Total	920.718	283			
Integration and Fulfillment of Needs (FON)	Between group	1.713	4	0.428	2.633	.078
	Within group	44.068	271	0.163		
	Total	45.781	275			
Shared Emotional Connection (SEC)	Between group	5.679	4	1.42	6.368*	.000
	Within group	62.428	280	0.223		
	Total	68.106	284			
Outside Relationship (OR)	Between group	17.746	4	4.437	5.32*	.000
	Within group	230.167	276	0.834		
	Total	247.913	280			

\* F is significant at the 0.05 level.



Legend: 1.00 – 1.80 = Very Low      1.81 – 2.60 = Low      2.61 – 3.40 = Average  
3.41 – 4.20 = High      4.21 – 5.0 = Very High

**Figure VII-7: Means of IFE, SEC, OR in Length of occupancy**

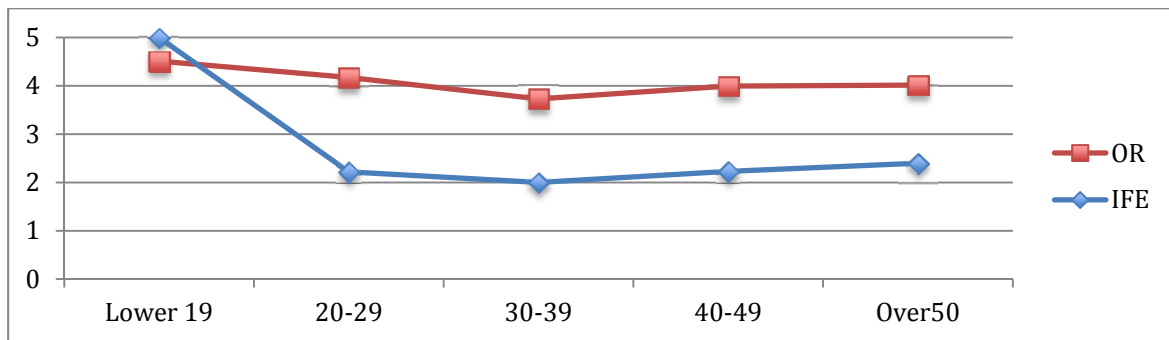
#### 2.4) Age (AGE)

In comparing age of respondents against sense of community, there are significant differences between ranges of age, namely, influence ( $F=2.339$ ,  $p<0.05$ ) and outside relationship factors ( $F=2.539$ ,  $p<0.05$ ). This finding indicates if the age of the respondents increased, the community relations will decline. This finding is evidenced from Figure VII-8.

**Table VII-10: ANOVA analysis between Age (AGE), IR, and OR**

		Sum of Square	df	Mean Square	F	Sig.
Membership (MBS)	Between group	13.182	4	3.296	2.071	.085
	Within group	469.5	295	1.592		
	Total	482.682	299			
Influence (IFE)	Between group	29.344	4	7.336	2.339*	.001
	Within group	918.911	293	3.136		
	Total	948.255	297			
Integration and Fulfillment of Needs (FON)	Between group	1.258	4	0.314	1.922	.107
	Within group	46.463	284	0.164		
	Total	47.721	288			
Shared Emotional Connection (SEC)	Between group	1.223	4	0.306	1.258	.287
	Within group	71.498	294	0.243		
	Total	72.721	298			
Outside Relationship (OR)	Between group	8.843	4	2.211	2.539*	.040
	Within group	251.671	289	0.871		
	Total	260.514	293			

\* F is significant at the 0.05 level.

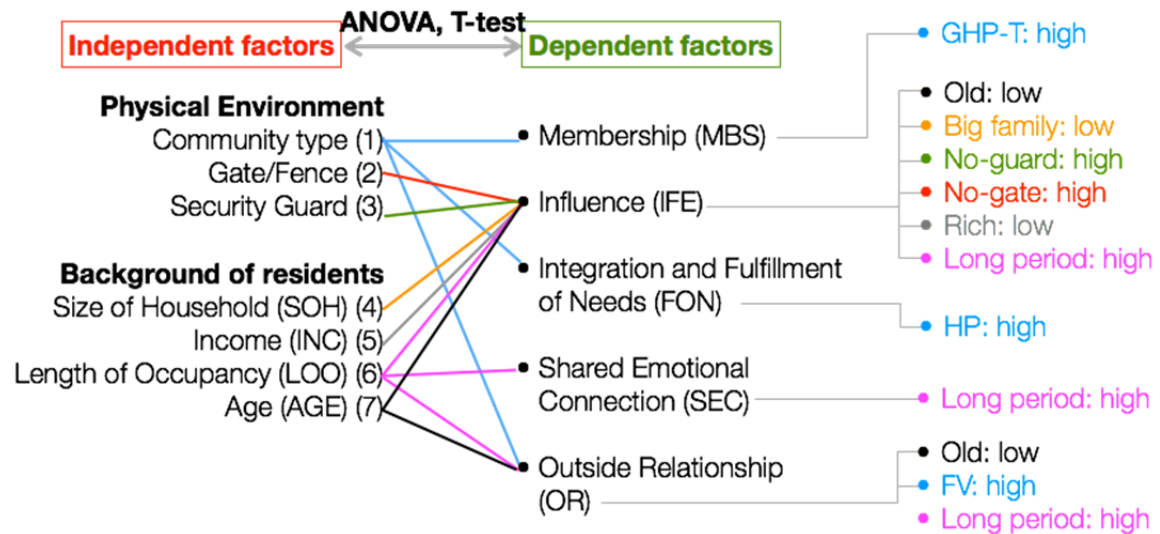


Legend: 1.00 – 1.80 = Very Low      1.81 – 2.60 = Low      2.61 – 3.40 = Average  
3.41 – 4.20 = High      4.21 – 5.0 = Very High

**Figure VII-8: Means of OR and IFE in Age of respondents**

### (3) Summary of influenced factors

As the importance of tendency analysis that mentioned above, the influenced factors on neighborhood relationship is necessary for suggestion points to improve future housing projects. The results from statistic analysis are concluded in Figure VII-9.



**Figure VII-9: Influenced factors on inside and outside relationship**

From the analysis, we found different independent factors effect on neighborhood relationship in distinct dimensions. The physical environment influenced on relationship of respondents. The findings herein show the community, which has no gates (FV and HP) and variety of human activities such as mixed-use area (GHP-T), provides increasing of inside sense of community and outside social relationship than GHPs. This results support Talen's work (1999) that mixed-use designs are thought out to create opportunities for people of different backgrounds to interact.

Particularly, the finding about existing gates reflects no-gated communities have slightly stronger neighborhood relationship than gated community. In the other words, gates have less influence on neighborhood relations but this output is analyzed from a part of questionnaire. This means importance of gate can be reduced but it cannot conclude that 'gate' is not a cause of the problems on social relationship. When we consider overall neighborhood relationship, GHP-D and IH have low strength of relations. The results from physical observation also indicate the problems of GHP development in study area; namely, fences of GHP disturb air ventilation of former villages, and effect on uncomfortable feeling.

Background of respondents also influence on social relationship as shown in Figure VII-9. The community, which consists of these characteristics; big size of household, high-income residents, and elderly residents, has tendency of weak neighborhood relationship. On the other hand, respondents who live in community longer, stronger neighborhood relationship they have. These findings and conclusions mentioned above will be discussed in Chapter VIII.

## 7.2.2. Disordered GHP development area: Influenced Factors of Inside and Outside Neighborhood Relationship

Beside descriptive analysis clarifies characteristic of respondents and explication of neighborhood relationship in previous section, it is essential to further investigate the correlation of factors that influence on neighborhood relationship. The prospected independent factors are completely explained at the beginning of chapter. They are considered according previous reviews of psychological and urbanism researches. However, the typical influenced factors are still being background of respondents and physical environment. Previously, there are no final conclusion what factors influenced on social relationship of residents, depending on context. The factors below are used to prove that associate with social relationship as former works' hypothesis. Herein we also keep investigating the correlation between both independent factors: physical environment and background of respondents; and dependent factors: inside and outside neighborhood relationship, in BMR context. According to format of data, ANOVA and T-Test are applied as statistic analysis. Beside the results are compared among five types of community, the influenced factors are also revealed and lead to ideas about recommendation.

### (1) Physical Elements of Communities

#### 1.1) Type of community

**Table VII-11: Summary of Inside and Outside Relationship – Type of Community**

Physical Factors Type of Community		IR				OR
		MBS	IFE	FON	SEC	
Former Village (FV)	Mean	2.82	2.35	2.95	3.79	3.21
	N	34	34	38	40	41
	Std.	0.968	1.515	0.486	0.758	1.386
		Average	Low	Average	High	Average
	Total	3.021 (Average)				
Gated Housing Project with Detached houses (GHP-D)	Mean	2.74	2.25	3.30	2.76	3.42
	N	54	53	49	53	55
	Std.	0.994	1.343	0.475	0.660	1.121
		Average	Low	Average	Average	High
	Total	2.826 (Average)				
Gated Housing Project with Detached houses (GHP-T)	Mean	3.14	2.05	3.11	2.49	3.84
	N	22	21	17	21	23
	Std.	0.560	1.284	0.353	0.630	0.777
		Average	Low	Average	Low	High
	Total	2.747 (Average)				
Non-Gated Housing Project (HP)	Mean	2.84	2.31	3.12	3.18	3.64
	N	165	172	166	180	182
	Std.	0.833	1.452	0.420	0.807	0.801
		Average	Low	Average	Average	High
	Total	2.870 (Average)				
Individual House (IH)	Mean	3.14	2.20	3.13	2.91	3.27
	N	49	46	315	48	51
	Std.	1.021	1.614	0.447	0.700	1.217
		Average	Low	Average	Average	Average
	Total	2.885 (Average)				

Legend: (Re) = Residential Area (Ind) = Industrial Area (Com) = Commercial Area  
(Agri) = Agricultural Area N/A = Not available area

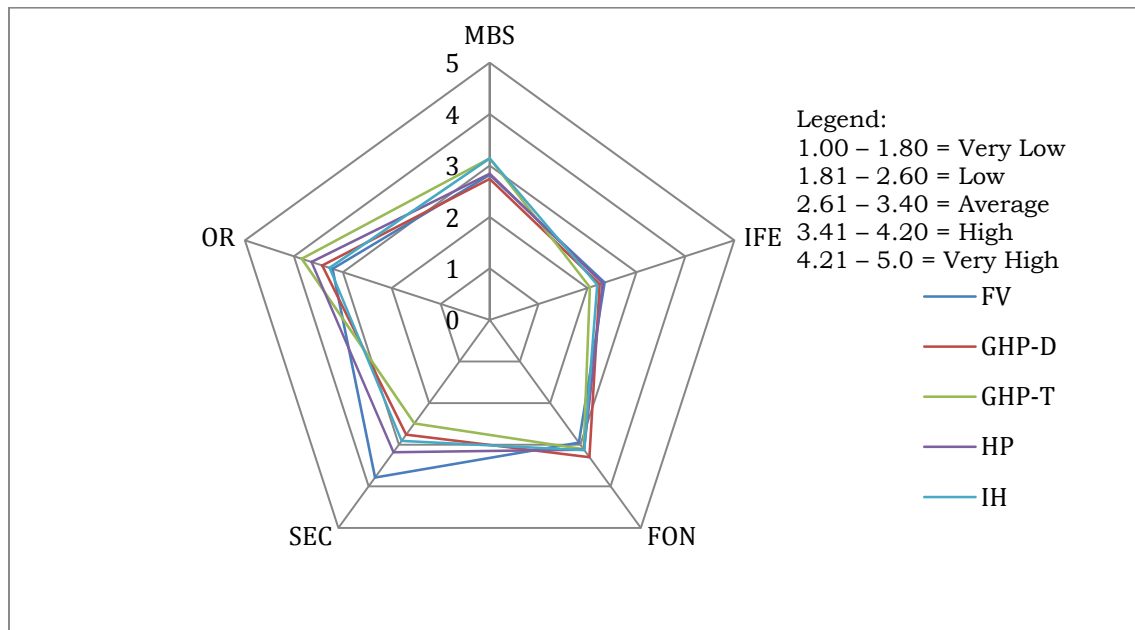


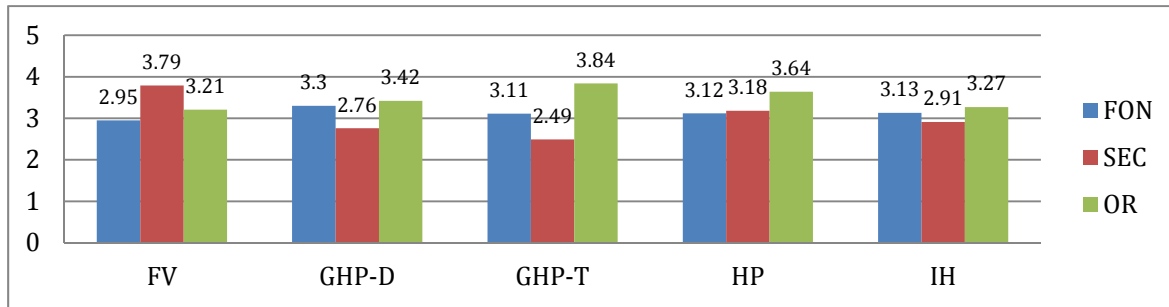
Figure VII-10: Level of inside and outside relationship in five types

Table VII-12: ANOVA analysis between Type of Community and Neighborhood Relationship

Factors		Sum of Square	df	Mean Square	F	Sig.
Membership (MBS)	Between group	6.195	4	1.549	1.946	.074
	Within group	253.805	319	.796		
	Total	260.000	323			
Influence (IFE)	Between group	1.809	4	.452	.213	.931
	Within group	680.436	321	2.120		
	Total	682.245	325			
Integration and Fulfillment of Needs (FON)	Between group	2.629	4	.657	3.386*	.010
	Within group	60.168	310	.194		
	Total	62.796	314			
Shared Emotional Connection (SEC)	Between group	35.486	4	8.872	15.529*	.000
	Within group	192.527	337	.571		
	Total	228.013	341			
Outside Relationship (OR)	Between group	12.489	4	3.122	3.112*	.039
	Within group	348.109	347	1.003		
	Total	360.598	351			

\* F is significant at the 0.05 level.

As shown in table above, type of community influenced on two dimensions of inside-neighborhood relationship, namely, Integration and fulfillment of needs (FON), Shared Emotional Connection (SEC); and outside relationship (OR). Hence, we focused on these three dimensions through the comparison in Figure VII-11, and the discussion of this section based on them. The different environment and characteristics of communities related with relationship of residents inside and outside gates.



**Figure VII-11: Comparison of correlated factors in type of community**

Type of community influence on neighborhood relationship

(1) Gated Communities (GHP-D, GHP-T) have similar level of neighborhood relationship, namely,  $SEC < FON < OR$

(2) Non-Gated Communities (FV, HP, IH) have higher level of SEC than Gated Communities (GHP-D, GHP-T)

(3) FV has lowest OR. OR includes 'Perception on surrounding' and 'Number of outside community's activity).

### **1.2) Gates and Security guards**

As results, when the communities have no gates, SEC is high. Table VII-13 that indicates higher level of SEC and INF in Non-Gated community supports this result, except FON. FON consists of 'successful of community' and 'fulfillment of needs', which GHP-D has highest environmental satisfaction (inside) and highest concern about gate (29.3%) and fence (20.8%) as shown in Chapter VI.

Therefore, 'Gate' is still important for GHP-D residents who need fulfillment of environmental satisfaction, but is less concern on other types of community. We suggest the future GHP development, which is not detached houses project, can reduce significance of gate such as less remarkable design or smaller size of gate.

**Table VII-13: T-Test analysis between Gate/Non-Gate and Neighborhood Relationship**

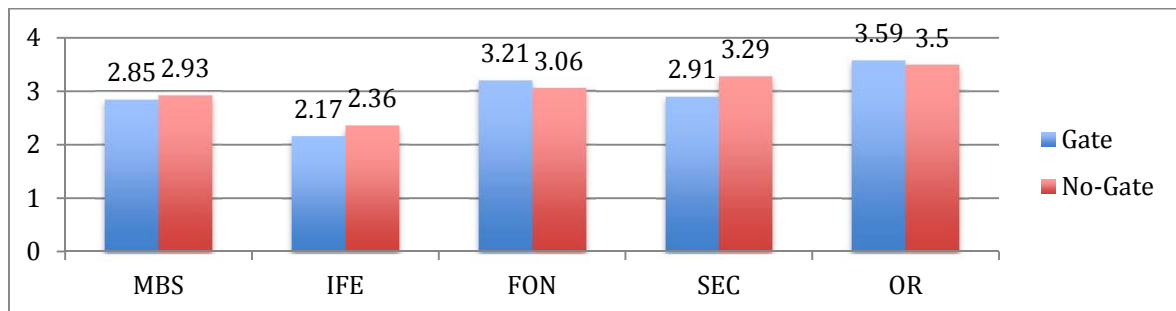
Neighborhood Relationship	Gate			Non - Gate			T-test	
	N	Mean	Std.	N	Mean	Std.	T	Sig.
Inside Relationship (IR)	140	2.80 (Average)	0.459	150	2.94 (Average)	0.548	- 2.246*	.015
Membership (MBS)	158	2.85	0.904	169	2.93	0.874	-0.883	.378
Influence (IFE)	158	2.17 (Low)	1.355	171	2.36 (Low)	1.521	-1.172*	.031
Integration and Fulfillment of Needs (FON)	153	3.21 (Average)	0.461	168	3.06 (Average)	0.435	2.857*	.005
Shared Emotional Connection (SEC)	165	2.91 (Average)	0.813	185	3.29 (Average)	0.780	-4.380*	.000
Outside Relationship (OR)	168	3.59	0.904	186	3.50	1.057	0.883	.378

\* T is significant at the 0.05 level.

Legend: 1.00 – 1.80 = Very Low  
3.41 – 4.20 = High

1.81 – 2.60 = Low  
4.21 – 5.0 = Very High

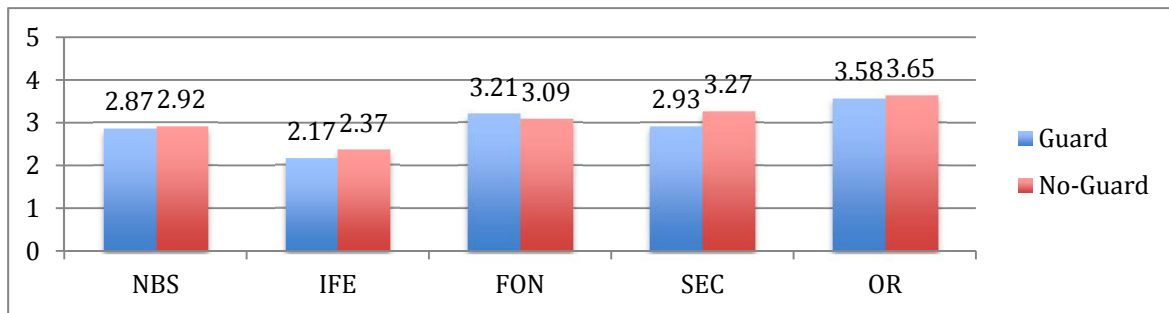
2.61 – 3.40 = Average

**Figure VII-12: Comparison of Gate and No-Gate****Table VII-14: T-Test analysis between Guard/Non-Guard and Neighborhood Relationship**

Neighborhood Relationship	Guard			Non - Guard			T-test	
	N	Mean	Std.	N	Mean	Std.	T	Sig.
Inside Relationship (IR)	151	2.82 (Average)	0.490	139	2.94 (Average)	0.527	- 1.966*	.050
Membership (MBS)	172	2.87	0.896	155	2.92	.882	-0.447	.655
Influence (IFE)	171	2.17	1.381	158	2.37	1.508	-1.280	.201
Integration and Fulfillment of Needs (FON)	159	3.21 (Average)	.396	153	3.09 (Average)	.472	2.282*	.030
Shared Emotional Connection (SEC)	174	2.93 (Average)	.747	167	3.27 (Average)	.823	-3.989*	.000
Outside Relationship (OR)	176	3.58	.889	169	3.65	.878	-.720	.472

\* T is significant at the 0.05 level.





Legend: 1.00 – 1.80 = Very Low      1.81 – 2.60 = Low      2.61 – 3.40 = Average  
 3.41 – 4.20 = High      4.21 – 5.0 = Very High

**Figure VII-13: Comparison of Guard and No-Guard**

## (2) Background of Respondents

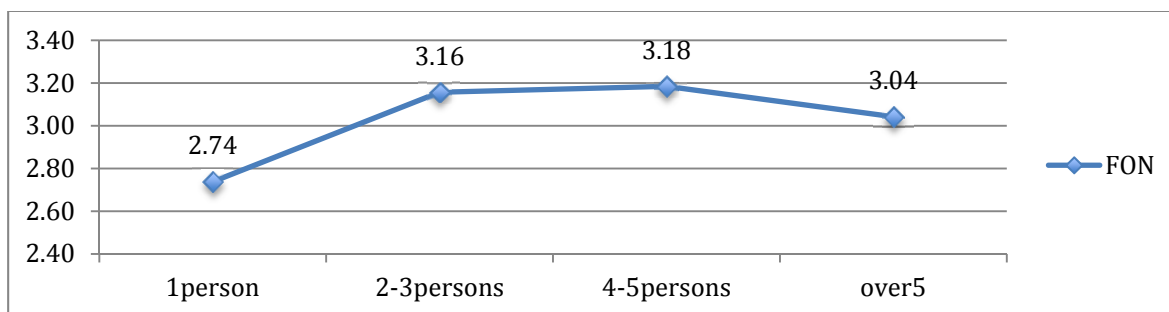
### 2.1) Size of Household (SOH)

**Table VII-15: ANOVA analysis between Size of Household (SOH), IR, and OR**

		Sum of Square	df	Mean Square	F	Sig.
Membership (MBS)	Between group	0.676	3	0.225	0.286	.835
	Within group	228.524	290	0.788		
	Total	229.201	293			
Influence (IFE)	Between group	0.687	3	0.229	0.106	.957
	Within group	629.36	291	2.163		
	Total	630.047	294			
Integration and Fulfillment of Needs (FON)	Between group	1.906	3	0.635	3.432*	.017
	Within group	53.115	287	0.185		
	Total	55.02	290			
Shared Emotional Connection (SEC)	Between group	3.598	3	1.199	1.845	.139
	Within group	199.616	307	0.65		
	Total	203.214	310			
Outside Relationship (OR)	Between group	0.19	3	0.063	0.061	.980
	Within group	324.811	315	1.031		
	Total	325.001	318			

\* F is significant at the 0.05 level.

Legend: 1.00 – 1.80 = Very Low      1.81 – 2.60 = Low      2.61 – 3.40 = Average  
 3.41 – 4.20 = High      4.21 – 5.0 = Very High



**Figure VII-14: Means of FON in size of household**

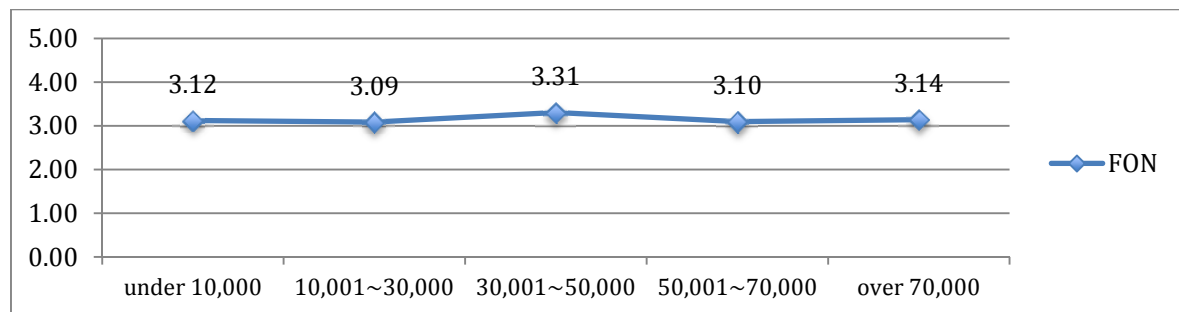
Table VII-15 shows number of family's member relates with FON. This reflects the relationship of density of people in housing unit on Integration and Fulfillment of Needs (FON). Figure VII-14 presents larger size of household is, the higher FON they have, especially 2-5 members in a household.

## 2.2) Family's Income (FIN)

**Table VII-16: ANOVA analysis between Family's Income (FIN), IR, and OR**

		Sum of Square	df	Mean Square	F	Sig.
Membership (MBS)	Between group	1.591	4	0.398	0.501	.735
	Within group	250.671	316	0.793		
	Total	252.262	320			
Influence (IFE)	Between group	10.073	4	2.518	1.201	.311
	Within group	664.958	317	2.098		
	Total	675.031	321			
Integration and Fulfillment of Needs (FON)	Between group	2.036	4	0.509	2.534*	.040
	Within group	61.681	307	0.201		
	Total	63.718	311			
Shared Emotional Connection (SEC)	Between group	2.975	4	0.744	1.124	.345
	Within group	221.053	334	0.662		
	Total	224.028	338			
Outside Relationship (OR)	Between group	3.336	4	0.834	0.839	.501
	Within group	340.982	343	0.994		
	Total	344.319	347			

\* F is significant at the 0.05 level.



Legend: 1.00 – 1.80 = Very Low      1.81 – 2.60 = Low      2.61 – 3.40 = Average  
 3.41 – 4.20 = High      4.21 – 5.0 = Very High

**Figure VII-15: Means of FON in family income**

Income of family also has significant relationship of FON. This result is presented in Table VII-16. Although, level of FON is not obviously difference comparing five groups of family income, the residents in middle class have higher level of FON.

### 2.3) Length of Occupancy (LOO)

**Table VII-17: ANOVA analysis between Length of Occupancy (LOO), IR, and OR**

		Sum of Square	df	Mean Square	F	Sig.
Membership (MBS)	Between group	9.137	4	2.284	2.879*	.023
	Within group	248.322	313	0.793		
	Total	257.459	317			
Influence (IFE)	Between group	13.228	4	3.307	1.587	.125
	Within group	654.177	314	2.083		
	Total	667.404	318			
Integration and Fulfillment of Needs (FON)	Between group	1.709	4	0.427	2.119	.144
	Within group	59.687	296	0.202		
	Total	61.396	300			
Shared Emotional Connection (SEC)	Between group	18.155	4	4.539	7.77*	.000
	Within group	187.509	321	0.584		
	Total	205.663	325			
Outside Relationship (OR)	Between group	3.136	4	0.784	0.902	.463
	Within group	284.307	327	0.869		
	Total	287.443	331			

\* F is significant at the 0.05 level.

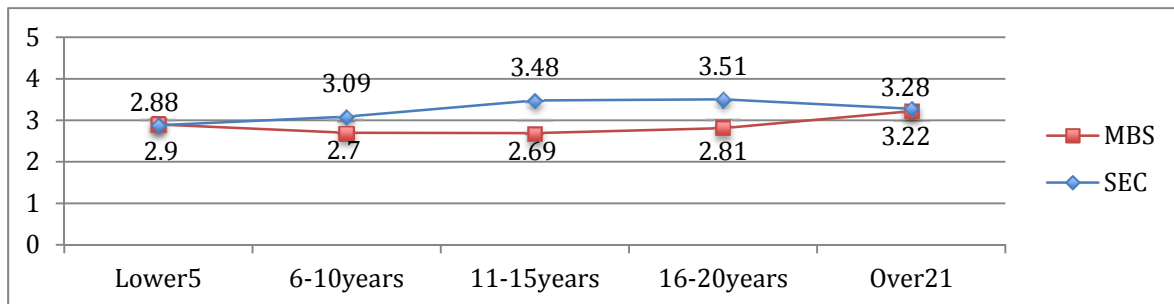
Legend: 1.00 – 1.80 = Very Low

1.81 – 2.60 = Low

2.61 – 3.40 = Average

3.41 – 4.20 = High

4.21 – 5.0 = Very High



**Figure VII-16: Means of MBS and SEC in Length of occupancy**

Length of occupy in this residential influences on SEC and MBS as shown in Table VII-17. Figure VII-16 presents tendency of level of MBS and SEC in each range of period of occupancy. The level of SEC reaches the peak on residents who live in the area around 11-20 years. In contrast, at the same length, MBS are lowest then we can assume that tendency of MBS and SEC is totally opposite. However, overall results reflect the longer period they occupy, the higher relationship they have.

## 2.4) Age (AGE)

**Table VII-18: ANOVA analysis between Age (AGE), IR, and OR**

		Sum of Square	df	Mean Square	F	Sig.
Membership (MBS)	Between group	0.088	4	0.022	0.028	.999
	Within group	257.142	320	0.804		
	Total	257.231	324			
Influence (IFE)	Between group	3.783	4	0.946	0.451	.772
	Within group	675.654	322	2.098		
	Total	679.437	326			
Integration and Fulfillment of Needs (FON)	Between group	1.198	4	0.3	1.485	.207
	Within group	63.331	314	0.202		
	Total	64.529	318			
Shared Emotional Connection (SEC)	Between group	17.297	4	4.324	6.933*	.000
	Within group	212.681	341	0.624		
	Total	229.978	345			
Outside Relationship (OR)	Between group	3.736	4	0.934	0.886	.472
	Within group	368.792	350	1.054		
	Total	372.528	354			

\* F is significant at the 0.05 level.

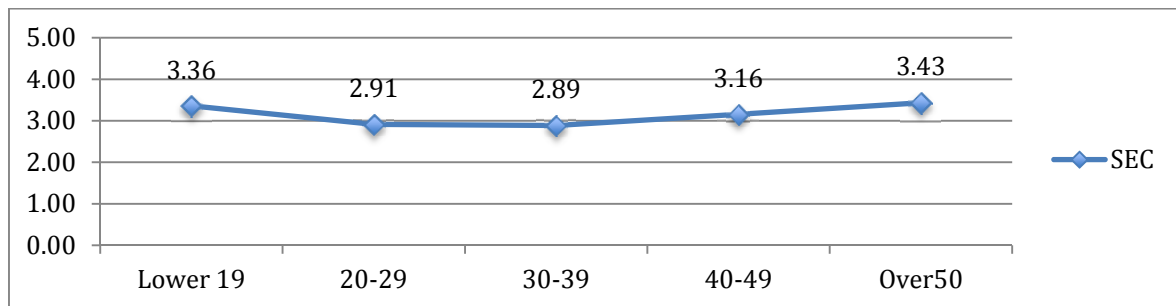
Legend: 1.00 – 1.80 = Very Low

1.81 – 2.60 = Low

2.61 – 3.40 = Average

3.41 – 4.20 = High

4.21 – 5.0 = Very High



**FigureVII-17: Comparison of Gate and No-Gate**

Table VII-18 discovers that AGE of respondents significantly relate with SEC. When we concurrently consider with Figure VII-17, SEC in FV is the highest value comparing with other types of community. In addition, Chapter VI also identifies average age of respondents in FV as the most aging (48.71 years old). On the other hand, the residents in GHP-T and IH are lowest average age (35.45 and 35.31 years old) also having lower SEC.

### (3) Summary of influenced factors

In order to achieve the goal of research, it is important to investigate influenced factors on the effects, especially on social relationship, to propose the guideline for future GHP development. The results from statistic analysis are concluded in Figure VII-18.

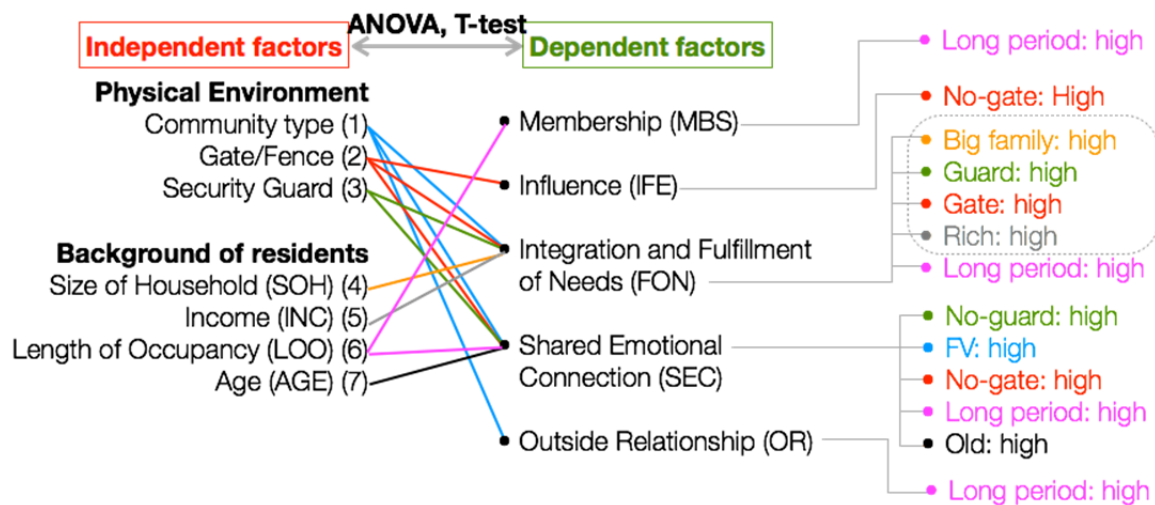
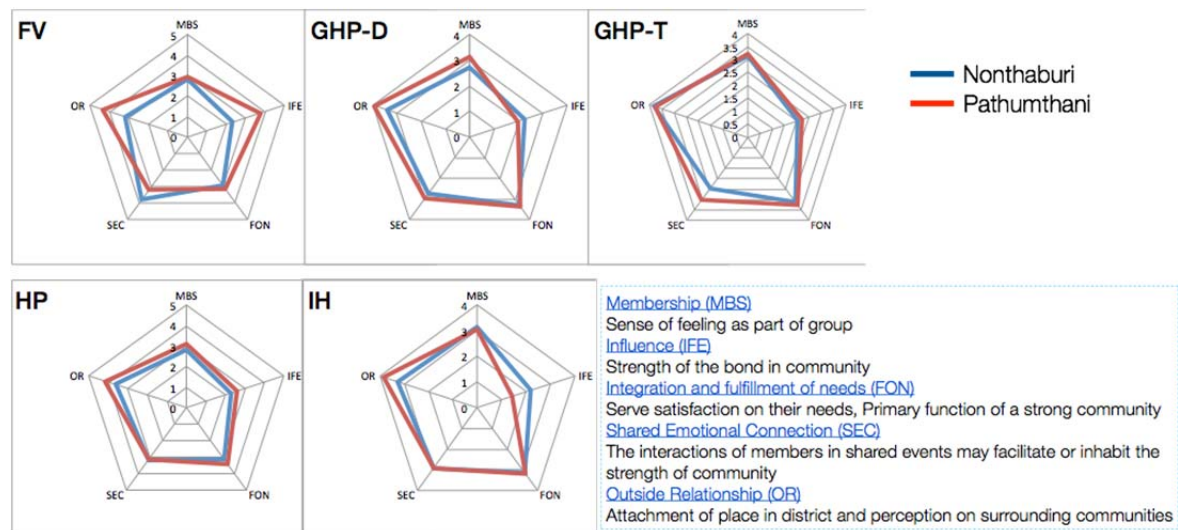


Figure VII-18: Influenced factors on inside and outside relationship

According to whole results above, we can assume that FV's respondents are opened-community that has quite strong inside neighborhood relationship, and they have civic duty and public mind for inside-outside community. Although GHP-D residents have low interaction with neighbors, but they has good perception to inside community environment and become closed-community. They satisfied to live in high fence and gate of GHP to make them feel extraordinary. GHP-T have low participation inside and outside activity, hence they have quite weak neighborhood relationship. It can be noticed via low trust on neighbors. Residents in HP and IH have similar perception, namely they place important on neighbors and believe in their communities even they have hardly visited their neighbors. The religious activity can motivate them to join and enhance accidentally contact with outside residents. In conclusion, the social interaction depends on different type of community and characteristic of residents. Former villagers seem to be the ideal residents who have no barrier to enhance social interaction, but they slowly migrate from this area because of GHP's threat. Therefore, the upcoming gated housing projects should paid more attention on former communities with redesigning the gates and fences, and choosing location, in order to reduce impacts in the future.

### 7.3. Comparison Analysis in district scale

Although Chapter V and VI already examined according results from questionnaires, there is correlation between both cases. This section can lead to conclusion about better situation for social relationship enhancement. Because both case study areas have totally different typology of land composition, it is necessary to compare results to clarify what typology has more encouragement of social relationship. Comparison analysis is applied to identify differences of social relationship inside community (membership, influence, integration and fulfillment of needs, and shared emotional connection) and social relationship outside community (Figure VII-19).

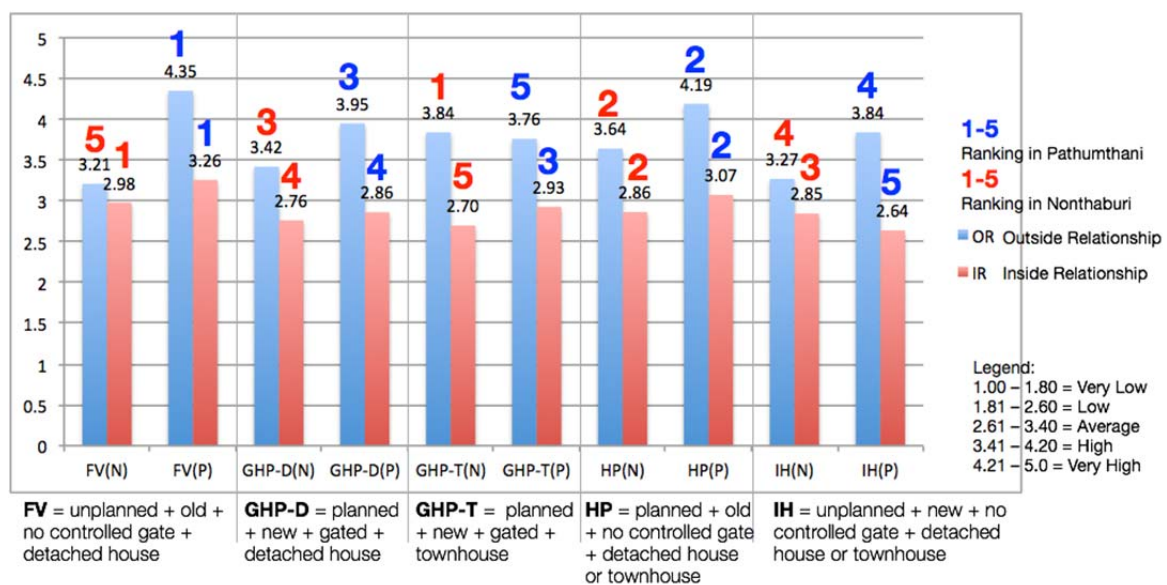


**Figure VII-19: Comparison of Inside – Outside neighborhood relationship**

In overall consideration, the direction of results in Pathumthani is similar as Nonthaburi area (Figure VII-19). This means the same type of community creates similar social relationship, but the social relationship in Pathumthani is better than Nonthaburi. Particularly, FV in Nonthaburi has obviously weaker inside and outside social relationship than FV in Pathumthani. This finding reflects high effects in Nonthaburi area on FV by GHP development as mentioned in Chapter VI. At the same time, FV in Pathumthani seems to accept the GHP development; even enclosed by walls of GHP (Chapter V).

In Figure VII-20 shows ranking of inside and outside social relationship comparing with both case study areas. Former villagers (FV) have strongest inside relationship (IR) and outside relationship (OR) in congested GHP area, while have weakest OR in disordered GHP area. These results confirm that outside relationship of former villagers in disordered GHP is influenced from physical effects as mentioned above. Gated housing projects with detached house (GHP-D) have similar level of IR and

OR in both cases. Beside OR of residents in gated housing project with townhouses (GHP-T) reaches strongest but lowest IR. This result can be supported from location of GHP-T is near by public faculties, while they have less participation with community's activities. Housing projects without restrict gates (HP) in disordered and congested GHP area has similar level of IR and OR at second ranking. The characteristic of HP is combined physical environment between GHP and Non-gated communities. They are used to be a GHP but limitation of access is canceled. Therefore, they still keep landmark at entry to give identity to a project. Individual houses (IH) in congested and disordered GHP area have very low IR and OR because they have the most ambiguous boundaries in five types of community.



**Figure VII-20: Overall Inside – Outside neighborhood relationship**

When considered mean of IR and OR in overall scale, most of communities in Pathumthani have higher than Nonthaburi, except OR of GHP-T and IR of IH. This result can indicate that residential area in Pathumthani more encourage IR and OR than Nonthaburi. Although there are high density of GHP but accessibility of communities are more facilitated than Nonthaburi. The income of residents are similar with five types of community, this create homogeneity in residential area. Moreover, the adaptation of inside environment of GHP by common agreement can reflect strength of collaboration among residents.



## 7.4. Conclusion of Findings

This chapter focuses on comparison and analysis of results from questionnaires in congested GHP area and disordered GHP area as shown in Table VII-19. As Table VII-19, the differences of consequence are depended on distinct characteristic of both cases. Therefore, recommendations for future residential development need more specification that will be proposed in the final chapter.

**Table VII-19: Conclusion of findings**

	Pathumthani (Congested GHP area)	Nonthaburi (Disordered GHP area)
<b>Comparison Analysis</b>		
Effect from land use transformation	<ul style="list-style-type: none"> <li>• Easy to make systematic road network</li> <li>• Unbalance between infrastructure supply and demand</li> <li>• Difficult to expand optional road network</li> </ul>	<ul style="list-style-type: none"> <li>• Difficult to make thoroughly road network</li> <li>• Easily disturb former agricultural activities</li> </ul>
Existing problems on living of inhabitants	<ul style="list-style-type: none"> <li>• Social problems: increasing fear of crime, totally change lifestyle of villagers</li> <li>• Environmental problems: Traffic congestion, poor air ventilation</li> </ul>	<ul style="list-style-type: none"> <li>• Environmental pollution on agricultural land use</li> <li>• Obstruction of accessibility of former villages</li> </ul>
Inside Neighborhood relationship	1) Local community has the strongest social relationship 2) Current elements of GHP cannot enhance inside social relationship	1) Local community has the strongest social relationship 2) Current elements of GHP cannot enhance inside social relationship
Outside Neighborhood relationship	1) Low social segregation in district	1) High social isolation in district 2) GHP-T has strongest outside relationship
GHP's physical condition	Adapted GHP	Typical GHP
<b>Tendency Analysis</b>		
Membership	Type of community	Length of occupancy
Influence	<ul style="list-style-type: none"> <li>• Age of respondents</li> <li>• Size of household</li> <li>• Guard/Restrict gate</li> <li>• Gate/Fence</li> <li>• Family income</li> <li>• Length of occupancy</li> </ul>	Gate/Fence
Fulfillment of Needs	Type of community	<ul style="list-style-type: none"> <li>• Size of household</li> <li>• Guard/Restrict gate</li> <li>• Gate/Fence</li> <li>• Family income</li> <li>• Length of occupancy</li> </ul>
Shared Emotional Connection	Length of occupancy	<ul style="list-style-type: none"> <li>• Guard/Restrict gate</li> <li>• Type of community</li> <li>• Gate/Fence</li> <li>• Length of occupancy</li> <li>• Age of respondents</li> </ul>
Outside relationship	<ul style="list-style-type: none"> <li>• Age of respondents</li> <li>• Type of community</li> <li>• Length of occupancy</li> </ul>	Length of occupancy

## References of Chapter VII

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## PART 4

### **Conclusions of effects by Gated Housing Projects Development towards basis guideline for future development**

This part consists of **Chapter VIII**, which summarizes results of all parts of research and suggests ideas of solution. The recommendations in this chapter are expected to be an initial concept to develop gated housing projects, which can reduce their effects.





## CHAPTER VIII

### Conclusion and Recommendation

Prior gated community studies have examined environment within residential projects to improve living quality of residents (Low, 2003; Blakely, et al., 1999; and Blandy, 2006). The consequences of gated community development also have been investigated in urban scale (Goix, 2006). Current studies of gated community have further criticized its effect comparing to non-gated community to indicated disadvantages of this residential development style (Sakip, et al., 2012 and Malikaphiphat, 2010). One of the most widely used methods of evaluation is a social perspective because it directly relates with quality of life of residents. In addition, gated communities in Southeast Asia have less attention; even they have rapidly developed in suburban metropolitan area. These studies have not focused on outside effects to surrounding communities and further impacts in urban level.

In this study, we evaluated effects of gated housing projects (GHP) in multiple scales (urban, district, and community) that comprehend not only inside GHP. In urban scale, we applied sprawl classification (Chapter III) to evaluate degree of effects. In district scale, physical observation was used to understand selected case study areas. In community scale, questionnaires and interviews were applied to investigate neighborhood relationship for inside and outside community (Chapter V and VI).

As mentioned in previous chapters, we recognized the effects evaluation of gated housing project development through multiple sources of evidences, according by aims of research. The multiple perspectives of analysis also conducted research conclusion and ideas to improve social relationship in gated housing development regarding research results.

This chapter summarizes results of all parts of research and suggests ideas of solution. The recommendations in this chapter are expected to be an initial concept to develop gated housing projects, which can reduce their effects. Moreover, the outcomes of research strive to point out the important factors that developers and local government should carefully concern before start the residential projects.

## **8.1. Summary of findings in each chapter**

According to the aim of research to evaluate effects related to gated housing projects on surrounding communities towards investigation of causes, all the findings should lead us to guideline for future GHP improvement. Even though, the main evaluation in this study focuses on social relationship, the supportive evidences should also be concerned. The examination combined three main parts of effect evaluation of gated housing project development from Table VII-I to Table VII-III.

Part I provided a literature review on sprawl comprehension in Bangkok metropolitan region. Then, the study found that gated housing project development is an important driver in sprawl phenomena and may relate to quality of living on inhabitants. Therefore, this part aims to identify primary effects from gated housing project development and investigate where problematic areas are. Chapter II and III are included to indicate this aims through sprawl classification as an evaluation in research, especially on gated housing projects' allocation. The findings of Part I are summarized in Table VIII-I.

### **(1) Conclusion Urban scale**

Gated housing development is a key driver of sprawl phenomena in BMR. In urban scale, the study found principle problems of sprawl related to GHP, namely, isolation of community, traffic congestion, and land use confusion. These empirical effects involve with quality of living of inhabitants. Therefore, sprawl areas are evaluated into 4 degrees of problematic area through effect evaluation (sprawl classification). The future sprawl area has the lowest impact from GHP development because most lands are undeveloped area. The late stage of sprawl area has advantages of convenience of travel because its land use is mixed types between residential and commercial area. The initial stage of sprawl area has some advantages, such as, mixed land use of residential and employment center, and almost being urban area. However, they have disadvantages about poor environment from industrial land use. Meanwhile, the critical sprawl area faces to many problems from unintended residential development replacing agricultural areas with ineffective urban planning. Therefore, this critical area (Pathumthani and Nonthaburi) is selected and evaluated inside-outside relationship of residents through GHP development.

**Table VIII-1: Summary of findings in Part 1**

Objective	Findings	Details	Chapter
1.1) To clarify primary effects and problems in sprawl phenomena	Factor of urban sprawl in BMR	<ul style="list-style-type: none"> <li>Characteristics: Low density, Discontinuous development, Land use, Huge migration, Weak urban and land use planning, Non effective road network, and low-density of residential area diffusion</li> <li>Key driver is 'Gated Housing Project' development</li> </ul>	2
	Effects of GHP development in sprawl phenomena of BMR	<ul style="list-style-type: none"> <li>Communities isolation in residential area</li> <li>Land use confusion and threat</li> <li>Traffic congestion</li> </ul>	
1.2) To specify characteristics and classify problematic area	Identification of critical sprawl area	<ul style="list-style-type: none"> <li>4 types of sprawl development area in BMR; Further sprawl area, Initial sprawl area, Late stage of sprawl area, Critical sprawl area</li> <li>Critical sprawl area: Highly developed area but inefficient infrastructure, and be selected as case study area</li> </ul>	3
	Degree of problematic area	<ul style="list-style-type: none"> <li>The first priority area to address is 'critical sprawl area'</li> <li>The next area that problems are coming is 'initial sprawl area'</li> <li>The low impact areas are in 'future sprawl area' and 'past sprawl area'</li> </ul>	
	Diffusion of mixed types of residential area, especially GHP development	<ul style="list-style-type: none"> <li>GHP diffusion in Critical sprawl area accumulatively locates on residential and agricultural land use</li> </ul>	
	Representative areas of research case studies	<ul style="list-style-type: none"> <li>Khlongluang district, Pathumthani province is a representative of congested GHP development in residential area</li> <li>Bangyai district, Nonthaburi province is a representative of disordered GHP development in residential area</li> </ul>	

Part II of study concentrates on effects evaluation of gated housing project in district and community scale. After realization of primary effects and location of problematic areas revealed in Part I, the social relationship is considered as a major effect for evaluation in Part II. Pathumthani and Nonthaburi province are representatives of the critical areas. The multiple sources of evidence are applied in this part including: Chapter IV designs tools for data collecting (physical observation, questionnaire, and interview); Chapter V and VI evaluates social relationship in case of Pathumthani and Nonthaburi, respectively. The findings of Part II are presented in Table VIII-2.

**Table VIII-2: Summary of findings in Part 2**

Objective	Findings	Details	Chapter
2.1) Existing situation of GHP in district scale	5 Types of community	<ul style="list-style-type: none"> <li>• Former villages (FV): unplanned + old + no controlled gate + detached house</li> <li>• Gated housing project with detached house (GHP-D): planned + new + gated + detached house</li> <li>• Gated housing project with Townhouse (GHP-T): planned + new + gated + townhouse</li> <li>• Housing project without controlled gate (HP): planned + old + no controlled gate + detached house or townhouse</li> <li>• Cluster of individual houses (IH): unplanned + new + no controlled gate + detached house or townhouse</li> </ul>	5 and 6
	Environmental problems	<ul style="list-style-type: none"> <li>• Lost natural air ventilation</li> <li>• Threaten agricultural land use</li> <li>• Traffic congestion</li> <li>• Noise pollution and water pollution</li> <li>• Communities isolation by disturbing local accessibility &gt;&gt; decrease opportunity of social interaction in public area</li> </ul>	
	Social problems	<ul style="list-style-type: none"> <li>• Increasing fear of crime in former villages</li> <li>• Totally change the way of life of former villagers in congested GHP development area</li> <li>• Lost privacy in adapted community</li> <li>• Difficult to keep agricultural activities in disordered GHP development area</li> </ul>	
2.2) Evaluation of social relationship of inside and outside residents in community scale	Characteristics of respondents	• Pathumthani: residents in area are low-middle class; FVs cancel agricultural activity; GHPs are active to adjust physical environment inside community	5
		• Nonthaburi: Income of GHP-Ds is extremely distinct from other communities; FVs are active agriculturists	6
	Neighborhood relationship in congested GHP development	<ul style="list-style-type: none"> <li>• FV has strongest IR and OR</li> <li>• GHPs have weaker IR and OR</li> <li>• HP has highly strong IR and OR relationship</li> <li>• IH has very low IR and OR relationship</li> </ul>	5
	Neighborhood relationship in disordered GHP development	<ul style="list-style-type: none"> <li>• FV has weakest OR</li> <li>• GHPs have weaker IR and OR</li> <li>• GHP-T in disordered area reach strongest</li> <li>• HP has highly strong IR and OR relationship</li> <li>• IH has very low IR and OR relationship</li> </ul>	6

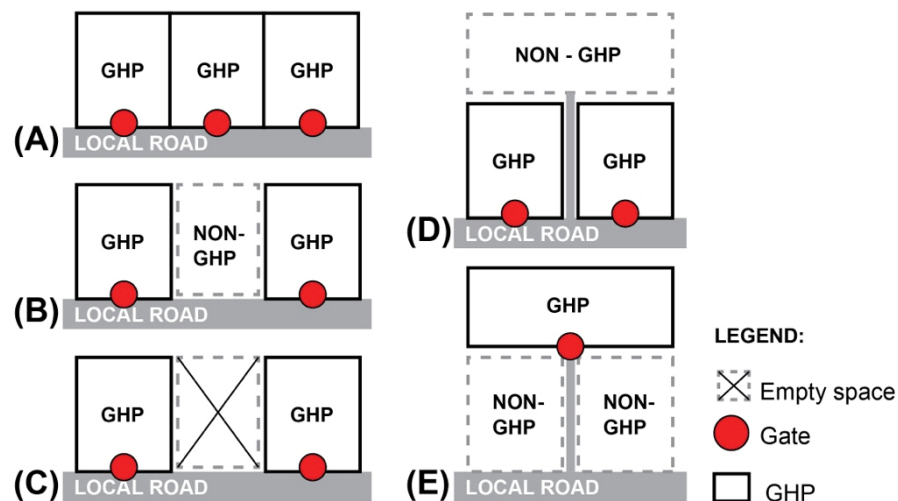
## (2) Conclusion in District scale

In district scale, we found suburban residential area consists of 5 types of community: former village (FV), gated housing project with detached houses (GHP-D), gated housing project with townhouses (GHP-T), housing project without restrict access (HP), and cluster of individual houses (IH). In Pathumthani, road network connects to every community and public facilities, such as, market, shopping center, and temple. This makes convenience for inhabitants to use those facilities outside communities. There is no highway interrupt between communities and mixed-use area. This character corresponds with neighborhood design of new urbanism. For creating of community

opportunity, network of streets should be interconnected to public space. Meanwhile, Nonthaburi has active canal network that connect to previous entrances of former villages, road network connects to gate of GHPs. It seems the canals link most of GHP and FV. Location of public facilities (market, shopping center, and temple) is divided from communities by highway. The functioning farmlands are existed in between GHP and FV.

In comparison of overall neighborhood relationship, characteristic of district in Pathumthani has more encouragement of inside and outside relationships than Nonthaburi area. Because the congestion of GHP in Pathumthani behaves like a compact area, while the disordered GHP in Nonthaburi leads to isolation of different types of community.

As physical observation in Chapter V and VI, we can conclude the feasible pattern of GHP attachment in both cases as shown in Figure VIII-1. Pattern (A) is often found in Pathumthani area. GHPs are attached side by side of community's fences. Pattern (B) and (C) can be found in Pathumthani and Nonthaburi. Non-GHPs (FV, HP, or IH) or empty lands are sandwiched by GHPs. Pattern (D) and (E) exist in Nonthaburi case. Some gates of GHPs directly connect to the public road and block access to Non-GHP (Pattern (D)). GHP builds private alley to connect public road and gate as shown in pattern (E). Hence, solutions of GHP improvement may different, depending on context and potential in that area.

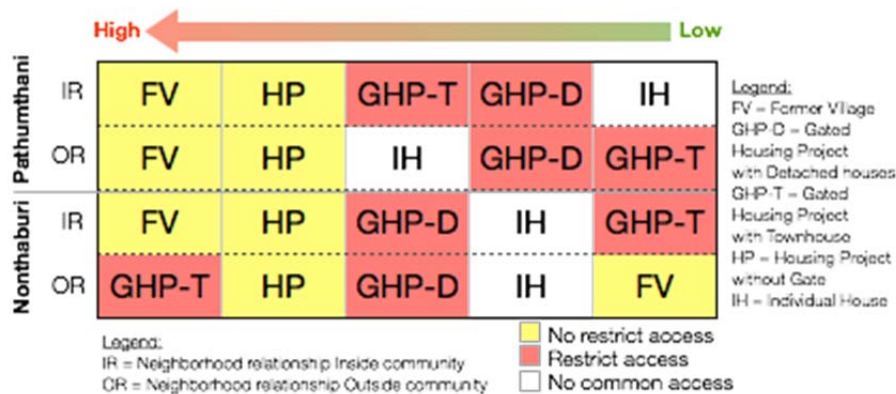


**Figure VIII-1: Pattern of GHP attachment**

In comparison of overall neighborhood relationship, characteristic of district in Pathumthani is more encouragement of inside and outside relationships than Nonthaburi area. Because the congestion of GHP in Pathumthani behaves like a compact area, while the disorder of GHP in Nonthaburi leads to isolation of different

### (3) Conclusion in Community scale

Although, Physical layout inside GHP in Pathumthani and Nonthaburi is similar, the surrounding context is different that lead to various effects. A GHP has to reach standard of land allocation act before local governmental approval. A GHP must provide common open space, self-management system, standardize common streets, and other standard utilities. These rules aim to create better quality of living for inside residents. However, style of layout, gates, and fences are optional elements from idea of developers, they are not included in the regulation. The accesses of GHP are always connected to public roads, such as, local roads or highways in Pathumthani and Nonthaburi area. The back of GHP in Nonthaburi is frequently attached with the canal by high fences, while GHP in Pathumthani is connected to empty spaces or alleys. This difference influences on future alternation or road network expansion in residential areas.



**Figure VIII-2: Pattern of GHP attachment**

Part III aims to synthesize results from Chapter V and VI towards conclusion and ideas of recommendation. Therefore, comparison analysis is applied to identify differences of social relationship evaluation based on different context of both cases. The study also reveals which area is better to encourage social relationship of inhabitants. Tendency analysis is implied to clarify relevant factors that influenced on social effects. The findings of Part III are included in Chapter VII (Table VIII-2). These results conduct ideas of recommendation in final section.



**Table VIII-3: Summary of findings in Part 3**

Objective	Findings	Details
3.1) Comparison analysis	Effects from land use transformation	Pathumthani: <ul style="list-style-type: none"> <li>• Easy to make systematic road network</li> <li>• Unbalance between infrastructure supply and demand</li> <li>• Difficult to expand optional road network</li> </ul>
		Nonthaburi: <ul style="list-style-type: none"> <li>• Difficult to make thoroughly road network</li> <li>• Easily disturb former agricultural activities</li> </ul>
	Existing problems on living	Pathumthani: <ul style="list-style-type: none"> <li>• Social problems: increasing fear of crime, totally change lifestyle of villagers</li> <li>• Environmental problems: Traffic congestion, poor air ventilation</li> </ul>
		Nonthaburi: <ul style="list-style-type: none"> <li>• Environmental pollution on agricultural land use</li> <li>• Obstruction of accessibility of former villages</li> </ul>
	Inside Neighborhood Relationship (IR)	Pathumthani: 1) Local community has the strongest social relationship 2) Current elements of GHP cannot enhance inside social relationship
		Nonthaburi: 1) Local community has the strongest social relationship 2) Current elements of GHP cannot enhance inside social relationship
3.2) Tendency Analysis	Correlated factors on neighborhood relationship	Pathumthani: Low social segregation in district
		Nonthaburi: 1) High social isolation in district 2) GHP-T has strongest outside relationship
3.2) Tendency Analysis	Correlated factors on neighborhood relationship	• Internal factors: Size of household; income; age; length of occupancy; physical environment
		• External factors: high density of GHP, inadequate road network, inside adaptation without well-design, High fences

## 8.2. Discussion on overall findings

From the summary of findings in previous section, we can reveal expected and unexpected results from social effect evaluation (Table VIII-4).

Firstly, common expected finding between both cases is ‘emerging of isolation among different types of community’. This finding is obviously found in Nonthatburi area because the nature of GHP wants to separate themselves from local communities via high-fence and restricts security as the rich. Moreover, the two different occupations between GHP and Non-GHP also reinforce the social segregation in district. This consequence was also found by Low (2003) and Sakip (2012) that difference of economic brought about demand of protection as wealthy people. According to local government interview and survey, we revealed disturbance from physical elements of GHP and wastewater release also effects on FV’s accessibility and farmlands. This evidence supports an increase of community isolation, beside the previous works’ findings.

**Table VIII-4: New findings of effects of GHP in this research**

Result	Pathumthani	Nonthaburi	Evidence	Previous researches
Expected	-	1) Isolation in residential area	Chapter VI,VII: FV has low outside relationship because of GHP's threat such as obstacle accessibility and paddy fields	Agree
		2) Local community is the strongest inside and outside social relationship	Chapter V, VI: Background of FV shows socialized behavior and familiarity in area	Agree
Unexpected	3) Low social segregation in residential area		Chapter V, VII: FV has positive perception on surrounding; even GHP's walls enclose them. FV seems accept the walls.	Refuse
		4) GHP-T has strongest outside relationship but weakest inside relationship	Chapter VI,VII: GHP-T often go outside community and has positive perception on surrounding	Refuse
		5) Current elements of GHP cannot enhance social relationship inside community	Chapter V,VI: GHP has poor inside and outside relationship, even has well environmental elements	Refuse
		6) Adapted GHP can create better social relationship than Non-adapted GHP	Chapter V,VI,VII: Adapted GHPs (Pathumthani) have better social relationship inside community than Non-adapted GHPs (Nonthaburi)	Refuse

Secondly, we found the behavior of the community type that related with social relationship in both cases, namely, FV is a local community which only active among its members. Thus, its inside relationship is better than other communities. This findings support Sakip, et al. (2012), which also found non-gated community had higher sense of community than gated community.

Thirdly, FV's outside relationship seems to be an indicator to highlight the social segregation in district scale. The findings in Pathumthani are unexpected findings and opposite with results in Nonthaburi area. Although FV is enclosed by the walls of GHP and is affected on their lifestyle, the perception on GHP and surrounding communities is still be good. This can show low segregated situation among locals and newcomers. Therefore, this finding is an initiative point to keep further investigates about the factors in the future work.

Fourthly, general image of GHP development is an isolated community in district. The unexpected finding in Nonthaburi case is stronger outside relationship in GHP-T than FV. This also argues the pervious finding in Pathumthani area. Although scope of this research mainly focuses on effect evaluation, this finding leads to further interesting point about how to enhance social relationship of GHP in district through this finding.

Fifthly, another previous studies supported that environment within gated community could motivate social interaction among residents through common recreation and clear boundaries (Low, 2003; Blakely, et al.,1999; and Blandy, 2006). The findings of this study argued that GHP community lacked of social interaction, even it provided well environmental design. The current typical compositions of GHP in BMR are consisted of 1) A gate with security guards, 2) Concrete fences enclosing

project, 3) Common facilities, such as, park, playground, club house, and 4) Basic infrastructure, such as, water supply, common road, and wastewater treatment. Thus, this finding is an unexpected outcome that reflects 'the failure of environmental design inside GHP because it cannot enhance the social relationship as theoretical ideas.

Lastly, the general understanding of resident attribution inside GHP is the rich who needs more privacy, security, and exclusive life (as mentioned in Chapter II). A GHP becomes the image of a perfect community for modern life because of its well environmental design (Low, 2003). Therefore, a GHP in BMR has continuously distributed in safe and unsafe residential area, depending upon high migration rate and residential demand. The study found unexpected findings of different GHP's community management and problems in GHP as follow;

There are GHP's members in Pathumthani who have adapted physical environment to be more opened, for example, adding minor entrance, providing temporary commercial zone, and sharing common inside utilities. This reflects inconsistency between lifestyle and provided utilities. However, this change within GHP simultaneously creates negative and positive effects. The positive consequences of this opening are creating liveliness in GHP and making stronger inside relationship than completely closed GHP. The negative consequences are increasing fear of crime and losing privacy of living for inside GHP. Only 25% of respondents of Pathumthani claim that they have problems living in GHP, according the results. Therefore the modification of GHP is possible way, but it needs more carefulness. On the other hand, GHPs in Nonthaburi have no adjustment on physical environment inside the projects. However, it does not mean that the designate living environment in GHP corresponds with behavior of members. Around 70% - 85% of respondents claim that they are facing problems living in GHP, such as, traffic jam, noise pollution, lacking of public transportation to GHP, poor garbage management, non-safety, and less communication in GHP.

Above results reflect the importance of community management system in GHP. Although, this system has been fixed in housing regulation since 2007, the practicable instruction is not existed. It is very important for long-term management in GHP community. The findings show the current community management system of GHP needs to be improved. Therefore, these findings are important information for public sector, who defines act or regulation of housing development, and private sector, who designs housing development.

Based on current situation of housing stock in BMR by report of REIC (2013), tendency of low-rise housing development has decreased since 2008, but it is still the highest market segmentation. It seems that we cannot completely restrain GHP development, but we can upgrade physical environment and management to create unification and reduce effects to surrounding. Present housing regulations indicate aim of housing development to improve quality of living of residents, but they still have a lot

defect of application. The public sector can add important conditions to improve social relationship inside and outside community. Nevertheless, the possibility in business perspective is not proved in this research, it is possible to suggest guidelines to improve quality of life of residents in GHP with less impact to outside communities.

### **8.3. Recommendations**

#### **8.3.1. For private and public sector**

Based on the findings and analysis in the earlier chapters, this dissertation concludes with recommendations for specific areas (case studies), as well as, general implementations. These following recommendations are proposed for developers and local government or policy implementation with expectation of social relationship encouragement.

1. In residential area that has high density of gated housing projects

As research results, the characteristics of gated housing projects that can encourage inside and outside social relationship should be provided: smaller size of housing unit (for 3-4 persons/unit); support low-middle class (income 10,000 – 30,000 THB/month) and younger generation; attractive and support long period of occupancy; and improve gated and controlled access system. It appears as the housing projects for new family that have few family members and little children.

2. In residential area that gated housing projects locate disorderly

Currently, the housing regulation and land allocation act is weak and not refined that is difficult to define direction of residential development in suburban area in long term. As conclusions above, the findings of effect evaluation in urban scale is useful for local government because the outcomes show ‘urgently improving area’ is as ‘critical sprawl area’. The public sector can recognize where is the first priority residential area to solve the problems through making specific policy or regulation.

The qualification of gated housing projects that can promote inside and outside social relationship in included: bigger size of housing unit (for 5-6 persons/unit); response high class (income over 70,000 THB/month) and past generation; and support long length of occupancy. Especially in gated housing projects with detached houses, it is necessary to keep ornamental gates and restrict accesses. This characteristic seems like residential projects for elderly people who need affluent image.

From this point, the mutual attributes are appearance of gate; restrict access, and long length of occupancy that can encourage inside and outside social relationship in both areas. The concrete samples how to convince residents to occupy longer and how

to improve gate system will be explained in the next section. The recommendations above are prospected ideas to improve gated housing projects based on research findings. The possibility of implementation also relies on feasibility in business sector as well.

### 3. Consideration of gates and restrict guards system

As the results in previous chapters, current style of gate and restriction of access from public road leads to some disadvantages on residents' living. The following presents ideas of gate and guard improvement:

- A) Size of project should be balance with number of gate. When considered in previous case in Pathumthani area, residents made secondary gate without well planning. It leads increasing fear of crime in community. As developers who have knowledge of community design, it is better to prepare appropriate scale of residential project with suite access.
- B) System of gate with restrict entry by security guard should be reconsidered because communities without limited access have higher inside-outside relationship. However, it also depends on context of projects that locate in crime risk area or not. We suggest that restrict gate system is necessary for housing projects in remote area, but it should be adapted, added or stopped this system when context in residential area are urbanized.
- C) Appearance of gate is important for fulfillment of needs of residents in GHP with detached house projects (affluent people). However, this element not involves with social relationship. Thus reduction of over-designed gate can save cost for developers to construct and for residents to maintain. The current fences of project also impacts on surrounding villages. It is possible to combine natural and man-made features as boundary of project.

In term of housing regulation in Bangkok metropolitan region, there is no limitation about appearance of elements in gated housing projects. Particularly, it has no specification of gate and fence style. The regulation identifies that developers have to provide environment that promote quality of living for inside residents. Therefore, it is possible to adjust the physical elements in the project to improve residents' living.

### 4. Promoting longer length of occupancy

As empirical evidences, people who have longer length of occupancy reach stronger social relationship. This creates bond of community and high sense of belonging. In long term, communities need to manage and maintain by inside residents. For instant, some residents changed environment inside community without well planning but leads to negative effects. Therefore, developers or planners should consider the next generation of residents in the future, such as, initiation of adaptive houses, common area or special welfare.

5. Location of gated housing project:

In district scale, there is significant result show allocation of gated housing project effects on surrounding communities. We suggest developers to pay attention about location of housing project not only in business aspect, but also social perspective, in order to reduce obstructed accessibility of former villages. Local government should suggest and provide appropriate zone for GHP to reduce effects on agricultural lands surrounding the projects. The distance from public facilities is important as well. It is better to locate as close as possible to commercial zone or add shops or temporary commercial activities inside the project.

### **8.3.2. For existing GHP in study area**

1. To improve inside social relationship in Pathumthani area

As research results, GHP-T should increase opportunities to improve social relationship because the current interaction has poor quality. Moreover, GHP-T should motivate people to realize importance of 'participation' because the lack of community concern (as shown in Chapter V). We suggest improving community management system in community. The community meeting can be split into cluster level (nearby houses) because 'neighbor' is an influencer in GHP-T. The current size of GHP-T is too large to gather participants within community. In addition, traditional activities or voluntary is effective events that can gather most of residents in community because they are common interest activities.

2. To improve inside social relationship in Nonthaburi area

The study suggests that GHP community should be improved inside social relationship through enhancing opportunity of interaction, such as, traditional activities (common interesting activity). The initiator of activity should be from neighbors because they are important influencers of GHP. The current system of community management is not practicable for arranging a meeting because it still leads to problems on common area and less participation in the meeting. Hence, the scale of meeting should be in neighborhood scale not in community scale. Providing areas in markets and temples for multiple-purposes should enhance to create social integration in district. For example, a mutual-aid center for unpredictable crisis experience to lead member sharing more community value should hold at the market or temple, including areas for public event from local government. Finally, upcoming-gated housing projects should pay more attention on former communities with redesigning the gates and fences, and choosing location, in order to reduce impacts in the future.

#### **8.4. Future works**

This study has limitation on data collection. Because GHP has high security system and privacy, it is difficult to question every respondent by face to face and to collect number of respondent as many as other communities.

Afterwards, this research already responded aim and objectives of study through multiple effect evaluations; there are continuous points from results analysis to apply these conclusions and recommendation in concrete way. However, they are out of scope of this research, we suggest the further works to continue analyze in another suburban residential area.